JPRS 70347

19 December 1977

WORLD

WIDE

TRANSLATIONS ON TELECOMMUNICATIONS POLICY, RESEARCH AND DEVELOPMENT

No. 24

U. S. JOINT PUBLICATIONS RESEARCH SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service, Springfield, Virginia 22151. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Indexes to this report (by keyword, author, personal names, title and series) are available through Bell & Howell, Old Mansfield Road, Wooster, Ohio, 44691.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

BIBLIOGRAPHIC DATA SHEET	1. Report No. JPRS 70347	2.	3. Recipient's Accession No.
4. Title and Subtitle TRANSLATIONS ON TELECOMMUNICATIONS POLICY, RESEARCH AND DEVELOPMENT, No. 24			5. Report Date 19 December 1977 6.
7. Author(s)			8. Performing Organization Rept. No.
9. Performing Organization Name and Address Joint Publications Research Service 1000 North Glebe Road Arlington, Virginia 22201			10. Project/Task/Work Unit No. 11. Contract/Grant No.
12. Sponsoring Organization Name and Address As above			13. Type of Report & Period Covered 14.

15. Supplementary Notes

16. Abstracts

This serial report contains translations from the world press and radio relating to worldwide political, economic and technical developments in telecommunications, computers, and satellite communications. Coverage will be worldwide with focus on France, Federal Republic of Germany, United Kingdom, Italy, Japan, the USSR, People's Republic of China, Sweden, and the Netherlands.

17. Key Words and Document Analysis. 17a. Descriptors

Worldwide
Computers
Satellite Communications
Electronics and Electrical Engineering
Telecommunications
Telemetry

17b. Identifiers/Open-Ended Terms

17c. COSATI Field/Group 09B, C, F, 17B, 22B

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
Unlimited Availability Sold by NTIS Springfield, Virginia 22151	UNCLASSIFIED	90
	20. Security Class (This Page) UNCLASSIFIED	22. Price

JPRS 70347

19 December 1977

TRANSLATIONS ON TELECOMMUNICATIONS POLICY, RESEARCH AND DEVELOPMENT

No. 24

CONTENTS PAGE

CONTENTS (Continued)

CONTENTS (Continued) Page

CONTENTS (Continued) Page

RADIO, TV COOPERATION AGREEMENTS WITH HUNGARY, BULGARIA, ITALY

Hungarian Cooperation Agreement

Budapest MTI in English 1028 GMT 18 Nov 77 LD

[Text] Budapest, 18 Nov, MTI--An agreement to cover cooperation between the Hungarian and the Cuban radios up to 1980 was signed Thursday in Havana by Istvan Hars, president of the Hungarian Radio, and by Nivaldo Herrera, president of the Cuban Radio and Television (ICRT), MTI's correspondent Peter Fort reports from Havana.

The contract calls for the exchange of specialists and programmes between the two mass communication media, and stipulates specific tasks the Hungarian Party will assume also in the future in order to modernize the technical equipment of the Cuban Radio.

After the signing ceremony Istvan Hars delivered an address in which he emphasized: The Hungarian Radio has always been promoting with every possible means, including technical aid, the socialist propaganda activity of the Cuban Radio, serving common goals and interests. The president of the Cuban Radio and Television underlined that the technical aid rendered by the Hungarian Radio was of vital importance to the Young Socialist Cuban Radio, and expressed his hope that the exchange of programmes and cooperation on other fields will help the two peoples learn each other more closely.

During his stay in Cuba Istvan Hars was received by Belarmino Castilla, vice premier, and he also met Orlando Fundora, head of the AGITPROP and Revolutionary Information Center of the Central Committee of the Cuban Communist Party.

The delegation led by the president of the Hungarian Radio has left Havana.

Italian Communications Agreement

Havana International Service in Spanish 1600 GMT 16 Nov 77 PA

[Text] A service contract which calls for the direct establishment of telephone, telegraph and TELEX communications between Cuba and Italy was signed here in Havana between (ITALCABE), a concession of the Italian Postal and Telecommunications Ministry, and INTELCUBA of the Cuban Communications Ministry.

The establishment of these services which will be via satellite through the intersputnik system will allow Cuba to have communications with Italy and other countries.

The contract was signed by Venturino Giacomelli, leader of the Italian firm, and Feliz Santiago, director of the Cuban telecommunications firm. It was said that this contract is the beginning of a series of agreements which will permit the improvement of Cuba's international communications with other countries for the 11th world youth and students festival to be held in Cuba next summer.

Bulgarian Cooperation

Sofia Domestic Service in Bulgarian 1830 GMT 16 Nov 77 AU

[Text] A working protocol on radio and television cooperation for 1978-1979 between the Bulgarian Radio and Television and the Cuban Radio and Television Institute has been signed in Sofia. On the Bulgarian side this protocol was signed by Ivan Slavkov, director general of the Bulgarian Television, and Ilcho Buchvarorv, deputy director general of the Bulgarian Radio. On the Cuban side it was signed by Antonio Molto, deputy chairman of the Cuban Radio and Television Institute.

CSO: 5500

EARTH STATION VISITED BY SOVIET COMMUNICATIONS OFFICIAL

Havana GRANMA in Spanish 7 Nov 77 p 3

[Article by Jesus Mena]

[Text] Yesterday the delegation led by the first deputy minister of communications of the USSR, Vasiliy A. Shamshin, visited the Caribe Earth Station in the municipality of Jaruco, toured its facilities and held a lively meeting with workers there.

The Soviet official was favorably impressed by the efficiency with which the Cuban technicians and specialists run the complex facility.

During their tour the visitors were accompanied by Emilio Gonzalez, the head of the earth station; Guillermo Cabrera, the head of station maintenance and operations, and representatives of political and mass organizations at the center.

Shamshin took advantage of his visit to make a call to Moscow, and this enabled him to verify the excellent operational condition of the station's technology. He also had the opportunity in a television room to appreciate the transmission quality of a program received direct from the USSR.

In his talk with Cuban technicians, Vasiliy A. Shamshin proposed that an initial meeting be held in Moscow next year among all of the countries in the socialist camp that are utilizing this system of communications. At such a meeting they would take up problems basically involving organization and service.

At present six countries in the socialist camp are using this communications system, Poland, Bulgaria, the GDR, Czechoslovakia, the Soviet Union and Cuba.

8743
CSO: 5500

BRIEFS

ANTARA-EFE COOPERATION--The Hague, 23 Nov (ANTARA)--Indonesia's ANTARA NATIONAL NEWS AGENCY and its Spanish counterpart, EFE, have agreed to promote bilateral cooperation on exchanges of news. The principles of the cooperation scheme were discussed by ANTARA's executive director, M. Nahar, and EFE secretary general, Alberto Proveda, in their meeting in Madrid recently. The Madrid meeting between the delegates of ANTARA and EFE was a follow-up of an earlier talk in Jakarta between ANTARA's general manager, Ismail Saleh, and Spanish ambassador to Indonesia, Pascual Villar, to discuss possible cooperation of the two countries' news agencies. The Spanish Foreign Office, which expected closer relations between the country and Indonesia, fully supported the cooperation agreement. In his meeting with ANTARA's representative, M. Nahar, Alberto Proveda expressed readiness of his news agency to help spread ANTARA's news in Latin America where EFE had its vast markets. The Spanish EFE NEWS AGENCY, which is relatively younger than ANTARA, is already equipped with computed and communication satellite system. It is now making preparations for the construction of its telecommunication centre in Manila to serve its Asian markets. In this connection, M. Nahar proposed a possible tripartite cooperation between ANTARA, EFE and the PHILIPPINNES NEWS AGENCY (PNA) which was warmly hailed by his Spanish counterpart. [Text] [Jakarta ANTARA in English 0736 GMT 24 Nov 77 BK]

CSSR-NETHERLANDS AGREEMENT--Prague, 18 Nov, CETEKA--General director of the Czechoslovak News Agency (CETEKA), Dr Otakar Svercina and general director of the Netherlands Press Agency (ANP) Dr Jolle Jolles signed here today an agreement on bilateral cooperation. The new agreement provides for exchanges of information between the agencies, and should contribute to better mutual understanding between Czechoslovakia and Holland. [Text] [Prague CTK in English 1731 GMT 18 Nov 77 LD] Minister Jaromir Obzina left for Moscow today at the invitation of Soviet Interior Minister Army General Nikolay Shchelokov. [Text] [Prague CTK in English 1702 GMT 18 Nov 77 LD]

POLISH-CZECH TV RELAY CONSTRUCTION--On Czarna Gora near Trutnowo, Polish specialists from BUDIMEX in conjunction with Czechoslovakian colleagues are building a television relay. It will be outfitted with, among other things, equipment produced by UNITRA. In honor of the 60th Anniversary of the October Revolution, a commitment has been made to complete construction earlier, by 15 December 1977. [Photo shows the 78 meter relay.] [Warsaw ZOLNIERZ WOLNOSCI in Polish 14 Nov 77 p 3]

CSO: 5500

BRIEFS

JAPANESE CONTRACT WITH ANTARA--ANTARA NEWS AGENCY and the Iwatani Company of Osaka concluded a contract in Jakarta on 19 November for the installation of telecommunications equipment for ANTARA headquarters and regional offices in the country. The project is financed under a 240 million yen Japanese aid program. The JAKARTA representative of the National Electric Company will supply telecommunications equipment for the expansion of ANTARA's domestic telecommunications network linking ANTARA headquarters in Jakarta with its offices in Palembang, Padang, Medan, Pontianak, Ujungpandang, Manado, Ambon, Ampenan, Yogyakarta, Semarang and Surabaya. [Jakarta Domestic Service in Indonesian 1200 GMT 19 Nov 77 BK]

JAPANESE SALES TO BURMA--Tokyo, Nov 22--Nippon Electric Company has received a 900 million yen order for communications facilities from Burma through Sumitomo Shoji Kaisha, Ltd, according to industry sources. The facilities consist of ground station electronic exchangers for satellite relay of International Telephone and Telex. Burma has improved its domestic telephone network. It will use the Intelsat satellite over the Indian Ocean to improve international telecommunication. [Text] [Tokyo KYODO in English 0840 GMT 22 Nov 77 OW]

CSO: 5500

BROADCASTING SERVICE TO PROVIDE MULTILINGUAL PROGRAMMING

Melbourne THE AGE in English 14 Oct 77 p 13

[Text]

The Government yesterday announced the establishment of a Special Broadcasting Service (SBS) which will incorporate multilingual radio broadcasts.

The Minister for Post and Telecommunications, Mr. Robinson, said in introducing the Broadcasting and Television Amendment Bill, 1977, that the special service may also be empowered to provide multilingual television services.

The SBS would assume the responsibility of ethnic broadcasts and be responsible for radio stations 2EA, Sydney, and 3EA Melbourne, he told Parliament.

The concept behind the SBS was that it would generally provide only those services which would not otherwise be available through the national, commercial or public broadcasting sector, Mr. Robinson said.

It would fund its operations by the broadcast of sponsored programmes, by charging for the provision of services and facilities and by the sale of programmes and rights or interests in programmes.

"It will not derive revenue by normal commercial advertising," Mr. Robinson said.

Mr. Robinson said another change implemented in the Bill was the transfer of the present Ministerial powers relating to the licensing of stations to the Broadcasting Tribunal.

"Responsibility for the licensing and regulatory functions in the broadcasting area should rest with autonomous statutory authorities," he said.

The principle of a broadcasting system not subject to political interference was one of the Bill's basic aims, Mr. Robinson added.

The activities of the Broadcasting Tribunal would be conducted in public and the public would have substantial access to an inquiry and the activities of the tribunal.

"The principle of accountability by broadasters within the system has also been considered as an important element," he said.

Mr. Robinson said broadcasters would be made to account, at renewal hearings, for their programming performance.

The Bill also allows the tribunal to hold public inquiries into licence renewals.

The tribunal will be empowered to grant, renew, suspend and revoke licences, authorise transactions in the transfer of licences, approve changes to the ownership and control of licences and set and vary conditions of licences.

CSO: 5500

TESTING OF OPTICAL COMMUNICATION FIBRES

Canberra THE AUSTRALIAN in English 10 Oct 77 p 10

[Text]

THE first Australian field trial of optical fibre communication has recently been completed at the Department of Defence Guided Weapons Electronics Support Facility at St Marys, NSW.

The Minister for Defence, Mr Killen, said that the successful trial was carried out by Amalgamated Wireless (Australasia) Limited in conjunction with Telecom Australia.

Optical fibres are glass fibres about the diameter of a hair and are capable of carrying thousands of messages. In their ultimate application, they could replace the traditional electric cable, at less cost, and with far greater message capacity.

Mr Killen said that the recent trial involved the use of cables jointly developed by AWA and Olex Cables Ltd. It consisted of the installation of a 2.3km optical fibre communication link, both underground and overhead. The underground section was partly ducted.

Mr Killen said that the cables, when used for field operations, had a military significance. They had a high message-carrying capacity, were light and compact to transport, easy to install and cost little when fully developed. The equipment would be permanently used as a data transmission link for the Guided Weapons Electronic Support Facility at St Marys.

CSO: 5500

SOLAR-POWERED RADIO-TELEPHONE SYSTEM AWAITS APPROVAL

Canberra THE AUSTRALIAN in English 10 Oct 77 p 12

[Text]

A RADIO-telephone link system which can be powered by solar panels is awaiting Telecom approval.

The Philips FM880 can be powered by Philips solar panels, independent of any other power supply.

With Australia's vast outback areas the extension of a national telephone network imposes a high cost burden on the subscriber or community. Over distances of about 16 kilometres the Philips system employs a total capital cost much cheaper than with traditional landlines.

The system is also a more economic alternative over difficult terrain where wire-laying costs would be excessive.

Typical applications of the FM880 include: remote rural properties, where individual subscribers may be linked to the nearest exchange in the national network; remote villages or small isolated communities; and mining sites or off-shore oil rigs and islands requiring connection into the mainland telephone network.

The system is a single-channel link and is economical in operation. The FM880 has an economiser circuit for the saving of battery consumption, unlike the normal telephone which is operative all the time.

The radio link operates in the very high frequency (VHF) band, and uses frequency modulation (FM), being therefore inherently insensitive to noise generated by electromagnetic radiation. It is, however, normally limited to relatively short-line-of-sight hops of between 50 and 80 kilometres.

In operation, the subscriber uses the telephone in the same manner as a normal telephone service and is unaware of the fact that a radio link is providing a normal telephone service.

The system is assigned two radio channels with about 5MHz separation, one for each direction of transmission. Each terminal is equipped with a transmitter and receiver unit, together with appropriate control logic.

For normal subscriber-exchange links, the only external connections to the terminals are the two-wire telephone lines to the telephone instrument and the exchange and cables to the power source and antenna.

Each terminal receiver continuously monitors the channel frequency of the other terminal transmitter, which is activated automatically whenever the initiation of a telephone call is detected.

A special "out of band" audio control is transmitted in each direction through the radio link to transfer the normal control functions, such as telephone "on hook — off hook" and dialling impulses to the exchange and ringing signals from the exchange to the telephone.

Philips anticipate an important export market to underdeveloped countries. The dependability of the unit is a great advantage for remote areas in other countries where terrain is often difficult and where trained technicians may not be available.

The unit can provide consistency of communication in disaster situations, where physical and traditional poles and wiring have been damaged.

CSO: 5500

NEW BANK PABX SYSTEM CUTS DELAYS ON CALLS

Canberra THE AUSTRALIAN in English 24 Oct 77 p 12

[Text]

ONE of the largest commercial PABX telephone exchanges ever installed in Australia has recently come into operation at the head-office building of the Commonwealth Banking Corporation in Martin Place, Sydney.

Supplied and installed by Amalgamated Wireless (Australasia) Limited, the PABX has 2000 extensions, 209 indialling exchange lines and 122 outgoing exchange lines.

It is the largest of a number of AWA-Hitachi AX3S-type systems recently installed for commercial enterprises and government departments.

Manufactured at AWA's plant at North Ryde, NSW, the equipment has a high degree of Australian content. It combines the expertise of AWA, the only Australian-owned company manufacturing PABX equipment, and Hitachi, a world-renowned company.

An interesting feature of the system is the large number of external extensions which are located in various bank premises remote from the head-office building. There are 413 of these external extensions in 68 different locations.

All external extensions have the full range of facilities provided for extensions within the head-office building.

This type of system is ideal for large organisations, since the internal telephone network becomes very economical and convenient to use.

In any organisation the telephonist plays an important role in establishing good client relations. Since the incoming traffic to an exchange varies greatly from hour to hour, the number of operators must be varied if high-quality service is to be maintained to all callers.

In the Commonwealth Bank PABX, up to 12 operators are required in busy periods but less are needed at off-peak times. The number of operators required at any time is determined by a supervisor who is provided with a control console which gives full information on the status of all incoming calls.

The supervisor can see at a glance how many calls have been delayed by more than 15 seconds. She can, therefore, take appropriate action to keep delays within acceptable limits. She is able to communicate directly with any operator by a private intercom system.

This is of great advantage in the training of new operators. Any "problem" calls can be transferred directly by the operators to the supervisor for detailed attention.

Statistical information is available to the supervisor, such as the total number of calls handled by each operator per shift, total number of calls per day, etc.

An important feature for improving service is the indialling facility, which enables an outside caller to dial directly through to an extension without requiring the assistance of an operator.

The caller dials the first three digits of the bank's listed number followed by the extension number. This connects the caller through to the extension, thereby reducing the number of calls handled by operators by an estimated 40 per cent.

Time is saved by the caller, since connections are set up more quickly and the operators have much more time to devote to those callers who do require assistance.

Other banking institutions are showing preference for AWA-Hitachi PABX systems in increasing numbers. In Melbourne a 600-extension AWA-Hitachi PABX is being installed at the Bank of New South Wales' headquarters.

Another system has just been completed for the Rural Bank of New South Wales, which recently moved into its new administration building at No 1 Oxford Street, Sydney.

The 500-line system is controlled by four switchboards and has both incoming and indialling exchange lines. The public uses the incoming lines, which are extended to the extensions by the operator, and the bank staff use the indialling lines to call directly to the wanted extension.

The Rural Bank will share this exchange with the Rural Assistance Board. Special equipment has been provided which enables each organisation to have its own groups of outgoing and incoming exchange lines and to receive separate accounts from Telecom.

In the same building the NSW Department of Consumer Affairs already has its own AWA-Hitachi PABX. This 800-extension exchange, with 68 indial lines and 58 outgoing lines equipped with five switchboards, will help the bureau meet the increasing demand by the public for its services.

CSO: 5500

BRIEFS

NEWS AGENCIES, PRESS COMMISSION--Union Information and Broadcasting Minister L. K. Advani said in PATVA 20 November that the question of setting up the second press commission was under the active consideration of the government. The union minister told a press conference that the government had also proposed to revive the press council. A draft bill was under preparation, he said. Questioned on setting up a corporation for the AIR [All-India Radio] and television he said the government was committed to grant autonomy to the AIR and the issue would be decided on receipt of the report of the Vergese Committee, which was expected by the end of February next. Asked when the four news agencies would start functioning following the union government's decision to revive the four agencies after dismantling the Samachar, Advani said the Samachar management had already been communicated to dismantle the setup and restore the status quo ante of the four agencies. He hoped that by the end of the year "the whole thing" would be finalised. Replying to a question whether the government considered the desirability of converting the press trust of India and other news agencies into a corporation as suggested by the first press commission, the union minister said "let the proposed second press commission or the news agencies say so and it would be considered." [Text] [Delhi ISI in English 0838 GMT 21 Nov 77 BK]

CSO: 5500

BRIEFS

ILLEGAL RADIO STATION--Jakarta, Suara Karya--The electronics control team of the Jakarta Metropolitan Police Command, in a raid conducted in the Jakarta area on 22 October, has uncovered an illegal radio station called the YDC Radio Studio at the Perdatam [Basic Industry and Mining Department] complex, rt 0011/02. The station has been ordered to cease its activities, since it does not possess the necessary licence. It is reported that the station has been active for some time. All equipment at the station has been confiscated as evidence. The man responsible for the station, BW [not further identified], has been summoned to the Jakarta Metropolitan Police Command for interrogation. The case will be brought to court soon. [Text] [Jakarta SUARA KARYA in Indonesian 27 Oct 77 p 8 BK]

CSO: 5500

PRC MANUFACTURES EQUIPMENT FOR LAUNCHING, RECOVERING SATELLITES

Peking NCNA in English 0725 GMT 26 Nov 77 OW

[Text] Peking, 26 November 1977 (HSINHUA)--China's electronics industry makes equipment for the launching and recovery of man-made earth satellites, including tracking, lodging and controlling systems, according to the National Conference on the Electronics Industry now in session here.

The electronics industry, a new branch developed after the liberation of China, now designs and turns out telecommunications, radar, broadcasting and television equipment, logging and surveying meters and navigational computers. All the semiconductor parts, integrated circuits, vacuum parts and electronic elements necessary for the manufacture of such equipment are made in China.

Telecommunications technology has been developing since China designed and built its first analog-type satellite communication ground station in 1975. Recently its first digital satellite communication ground station was put into operation with satisfactory results. The double-channel colour television programmes relayed from telecommunication satellites are clear, and the sound is good.

In the field of broadcasting and television, China designs and makes high-power, high-frequency transmission equipment and uses such techniques as mixing of frequency bands. Complete equipment for braodcasting, transmission, relay and receiving of colour television are produced.

The making of a higher-speed, integrated-circuit computer, following the digital computer, using large-scale integrated circuits with an average speed of one million operations per second in 1973 marked a new level in computer technology. Big progress has also been made in the peripheral device.

Along with the growth of the industry, electronic techniques are being applied to agriculture and other fields, such as for seed treatment, processing of farm produce, plant and crop protection, grain storage and soil analysis. Integrated type potentiometers have been introduced for locating water in hilly regions and resistivity meters for this work on flat terrain. Use of these meters, which is now widespread, has raised efficiency.

Numerical and programme-control electronic equipment for machine tools is now prevalent in industry. Equipment for automatic control is being popularized in the petroleum, power, steel and light industries.

For medical use, the electronics industry has trial produced a number of instruments for diagnosing, treating, monitoring and for chemical analysis. Included are apparatus for diagnosing heart functions, x-ray television, gamma-ray equipment for radiography, linear accelerators, laser instruments for ocular diseases and cardiac pacemakers.

The policy of simultaneous development of national and local industries and of big, medium-sized and small enterprises has been followed in expanding the electronics industry. The state has set up a number of big electronics factories as the backbone, and many small and medium-sized enterprises have been established in the mass movement in various places. There are neighbourhood community workshops run by housewives producing electronic elements and parts.

The whole industry now has 2,800 enterprises, big and small, in all parts of China. Fiftyone research institutes are affiliated directly with the Fourth Ministry of Machine Building.

CSO: 5500

BRIEFS

NINGSIA MICROWAVE PROJECT--Ningsia Hui Autonomous Region has completed a project of extending the Peking-Lanchow microwave circuit to Yinchuan. This circuit can be used to relay Peking TV programs as well for telephone, telegraphic and radio facsimile services. [Peking Radio in Mandarin to Taiwan 1500 GMT 5 Nov 77 OW]

PROGRESS IN TELEPHONE TECHNOLOGY--Heilungkiang Electronic Technology Research Institute has succeeded in building an electronic computer which can be used for computing long-distance telephone charges automatically. Thanks to this computer, such charges can now be calculated not only more quickly and accurately, but also at an efficiency 32 times higher than conventional methods. [Text] [Harbin Heilungkiang Provincial Service in Mandarin 2130 GMT 28 Oct 77 SK]

CSO: 5500

BRIEFS

RADIO PROGRAMS ON AGRICULTURE--The Ministry of Information and Culture is devoting appropriate attention to agricultural development. At present there are news relay stations in 30 provinces and cities. In addition to relaying programs from Radio Vietnam, local relay stations also carry their own programs to directly support agricultural production. Wired speaker systems to relay radio broadcasts have been installed in almost every province and village. [Hanoi International Service in Thai 0500 GMT 17 Nov 77 BK]

HA BAC TELEPHONE NETWORK--The Ha Bac Provincial post office recently put into operation a 600-line automatic telephone switchboard. This project was installed by the provincial postal service cadres and workers to serve the provincial party organization's leadership. They have also extended the telephone network down to a number of districts. [Hanoi Domestic Service in Vietnamese 0530 GMT 21 Nov 77 BK]

QUANG NAM-DANANG TELEPHONE NETWORK--In September and October, cadres and workers in the Quang Nam-Danang provincial postal sector expanded the information and telecommunications network to support agricultural production. With discarded materials and old equipment they produced nearly 40 km of wire, 3 switchboards and 26 telephone sets, and replaced two switchboards in two districts with new ones with 40 lines each. [Hanoi Domestic Service in Vietnamese 0530 GMT 21 Nov 77 BK]

CSO: 5500

OBSOLETE TELECOMMUNICATIONS SYSTEM EXPOSED

Sofia STURSHEL in Bulgarian 7 Oct 77 p 3

[Article by Lyubomir Yanev: "Unofficial Records"]

[Excerpt] As we were talking about telephones, we should mention that we still use cables and exchanges of the type ATTs-29. The number 29 determines the year when these stations were introduced. Thus, a unique world record of being years behind has been established! Because, since then many new systems and cables have been introduced all around the world. Bulgaria is not lagging behind in this respect either. It discovered many new things. It purchased many licenses. For 7 years our industry has been studying a modern license in this field as well, but, for the time being, it is still in the process of studying it. Perhaps it is waiting for it to get old enough. But this is not wine.

It is a fact that currently there are cables and equipment for over 10 million leva lying idle due to numerous organizational reasons, that is, violating regulations and decrees of the Council of Ministers in Sofia. And this is taking place just when there are over 100,000 applications in the capital for new telephones. We built Complex Mladost [Youth]. This complex gave birth to a second generation - Mladost 2. There will be Mladost 3 as well. They will have flowers and playgrounds for the children. However, if a child fell and got hurt, there would be no telephone to call emergency. For the SGNS [Sofia People's City Council] and the construction organizations do not wish to observe the decrees that state that one must first construct buildings for telecommunications services, cable channels, etc. before planting flowers.

While writing these lines, one of my colleagues, annoyed with his unsuccessful telephone call, said casually:

"Strange. Our communications system is awful and yet we celebrate Communications Day. And we honor them with congratulatory concerts. Other countries do not have such holiday but have excellent communications system...."

It may be true that we do not have an excellent communications system but we have excellent communication workers. And these concerts are for them, for the good workers. And we, although late, want to congratulate them on their holiday. And we hope, that by next year our communications system will improve so much, that for their holiday we will be congratulating them not with articles but with a telephone call or a fancy telegram - as long as there is someone to deliver it the same day.

1010
CSO: 5500

ESTEL SYSTEM FOR DATA TELEPROCESSING

Sofia BULGARIAN FOREIGN TRADE in English No 5, 1977 p 19

[Article by Engineer C. Serbezov]

[Text]

Bulgaria is one of the few countries in the world which produce systems for teleprocessing of data.In the sphere of computer technique it has amassed sufficient designing and production know how to start manufacturing a system for teleprocessing known as Estel. This system was developed at the Institute of Computer Technique in Sofia and its production was launched at the plants of Isot. Estel operates with calculators of the unified computer system established in the socialist states. Its technical programming is in conformity with the models ES 1020, ES 1030, ES 1040 and ES 1050. Hence its name, which is a Bulgarian abbreviation of the words' unified system for teleprocessing. Estel also conforms to IBM computers of the series 360 and 370. Its functioning calls for computers with a minimum memory of 128 K.

The Estel system consists of the following major technical means:

Multiplexor ES 8401

This is the key device of the whole system. It controls up to 63 lines at a data-transmission speed of 600 bits/sec, of which 31 lines are ES 8501 terminals or telexes and up to 32 are videoterminals. ES 8401 can secure exchange at the following speeds: 50, 75, 100, 200, 600, 1200 and 2400 bits/sec. Its transmission codes correspond to international standards. Its regime of work is start-stop. ES 8401 can function on telephone and telex lines,both commutable and leased. If necessary, it can also operate on physical lines. There are special adapters for the realization of these communication possiblities.

Terminal ES 8501

It operates on telephone and telegraph lines at a data-exchange speed of 50 to 1,200 bits/sec. Its regime of work is start-stop. It has a buffer memory with a capacity of 160 characters. It includes a typewriter,a punched-tape reader, a tape perforator, a punched card reader and, depending on the line to which it is connected, a certain type of modem or signal transducer. It should be noted that, besides terminal ES 8501, the Estel system permits the inclusion of terminals from other producers. Terminals with more limited possibilities

than those of ES 8501, as well as videoterminals, can be included. An ordinary telex apparatus can also be used as terminal.

Modems ES 8001 and ES 8005

These secure data-transmission and reception along two-channel lines with a respective speed of 200 and 600/1200 bits/sec.

Automatic dialling device ES 8061

It secures an automatic connection of multiplexor and terminals whenever commutable lines are used.

Linear Stand Alone Unit Apparatus

It houses different modems and adapters as well as a special testing apparatus for checking the condition of the communication lines.

It should be stressed that all the above-listed technical means fully conform to the requirements of the International Consultative Committee for Telephony and Telegraphy(MCCTT) thus ensuring its employment in all modern communication networks.

The Estel system offers a wide range of programming, both basic and applied. It operates under the control of a modern operational system. The complex question of checking the proper state of teleprocessing systems as a whole is solved in the case of Estel by means of various schemes or special self-diagnosis programmes.

Thanks to its high properties, the Estel system has aroused considerable interest abroad. Its export, including mounting and putting into operation, is handled by the foreign trade organization Isotimpex, Sofia.

CSO: 5500

ABINEE MAY HALT OPERATIONS BY YEAR'S END

Rio de Janeiro JORNAL DO BRASIL in Portuguese 26 Oct 77 p 19

[Text] President of the Asociacao Brasileira da Industria Electrica e Eletronica (ABINEE) Manuel da Costa Santos yesterday told President Geisel, by whom he was granted an audience, and the finance minister, who accompanied him, that the telecommunications equipment industry has already released 5,000 of its 40,000 employees and is in danger of shutting down by the end of the year, when it has completed delivery of orders received in 1976, because this year it has not received a single order from the state enterprises associated with the Ministry of Communications.

Communications Minister Quandt de Oliveira stated yesterday in Sao Paulo that in 1978 the 26 subsidiary companies of TELEBRAS will increase their orders to the industry by 50 percent above the 1977 volume. Yesterday in the capital city of Sao Paulo the minister dedicated the building that will serve as EMBRATEL headquarters in the southern district--a telephone switching point, 800 new telex terminals in greater Sao Paulo, and a television microwave system between Sao Paulo and Belo Horizonte.

Priority

The heavy electrical equipment plants are suffering the effects of foreign competition, especially transformers and switches. They have systematically lost out in international bidding by virtue of Finance Ministry directive No. 1 of 1976, which does not automatically give full tax benefits, including draw back, for national producers in competition with foreign offers," said Mr Costa Santos.

"We are recommending to President Geisel that, under Resolution No. 9 of the Economic Development Council, priority be given to national industry, that is, that national industry first be asked whether it can supply the item, with financing from FINAME, and only then resort to international bidding and seek outside financing. We want national industry to be given a share of the market," he added.

After being received by Finance Minister Mario Henrique Simonsen, the president of ABINEE said yesterday that the Cr$ 27.2 billion earmarked for TELEBRAS investments in 1978 are insufficient to meet the needs of the enterprises of that sector. Although he recognizes that the level is better than that for this year and he considers the fact that it was set almost 3 months prior to the end of the year as a positive factor, Mr Costa Santos feels that the programs for expanding the productive capacity of electro-electronics firms require greater resources than those granted. Anyway, the companies of that sector can now plan the tempo of their activities in 1978.

7428
CSO: 5500

EMBRATEL PRESIDENT SAYS NATION DEFICIENT IN TELEPHONES

Sao Paulo FOLHA DE SAO PAULO in Portuguese 25 Oct 77 p 14

[Text] "Brazil is still included among the countries deficient in telecommunications, even compared with other Latin American countries. We have 3.6 telephones for every 100 inhabitants, while Argentina and Mexico have about 7. We should have between 7 and 10 telephones for every 100 inhabitants."

The one making that statement is EMBRATEL President Haroldo Correa Mattos, who is today dedicating a new inter-urban telephone switching station, together with Communications Minister Euclides Quandt de Oliveira.

This new switching point, the third one to be installed in Sao Paulo, has 7,800 circuits, that is, a capacity for handling 7,800 calls. In addition, 1,170 new telex terminals will be delivered to 33 cities in the state of Sao Paulo, a new EMBRATEL headquarters will be opened, as will a microwave trunk between Sao Paulo and Belo Horizonte, with a capacity of 7,200 telephone circuits and two channels exclusively for TV. Costing approximately Cr$ 21 million, it will be the fifth alternative route for linking the National Telecommuncations System and will basically handle traffic with Brasilia and the entire Northeast, which up until now has been done through Rio and Uberaba.

According to Haroldo Correa de Mattos, since 1964 (when EMBRATEL was established) the number of telephones in Brazil has increased from 1 million to 4.5 million. By the end of this year a new 4,200-circuit inter-urban exchange estimated to cost Cr$ 180 million is to be opened in Sao Paulo.

He also revealed that EMBRATEL's 1978 budget is Cr$ 3.5 billion. However, it shows an increase over this year's budget (2.7 billion) that only amounts, practically speaking, to an adjustment for the inflation factor.

7428
CSO: 5500

EMBRATEL TO PARTICIPATE IN PROJECTS IN COLOMBIA

Brasilia CORREIO BRASILIENSE in Portuguese 29 Oct 77 p 6

[Text] The possible participation of Brazilian technicians in the project involving a Colombian satellite to be launched in 1979 and the training of international telephone operators from that country in Brazil were the two subjects discussed yesterday by EMBRATEL President Haroldo Correa de Mattos and TELECOM President Victor Beltran Martinez, who came to Rio as head of a delegation of four directors of that state enterprise.

With characteristics similar to the one that would be used by Brazil, where preparations were suspended by President Geisel last June, the Colombian satellite will be acquired through international competitive bidding, together with the ground tracking stations, at an approximate cost of $200 million. The experience gained by EMBRATEL in drafting technical specifications for the project and in evaluating the proposals submitted will be made available to Colombia for the carrying out of her program.

Cooperation

According to the president of EMBRATEL, "all the experience gained in the 2 years we worked on the Brazilian satellite continues to be developed, since the government is not ruling out the possibility of resuming the project at another time." He made it clear that "because of that possibility, the group of technicians who participated in the program is being kept up to date on the entire technology of the system, which introduces something new every day."

Correa de Mattos feels that "the Colombian interest is really very great, in view of the extreme similarity between her system and ours, which are comparable from the orbital position selected for the satellites to the characteristics of the regions that they seek to cover, composed of communities in the Amazon basis." As for possibly furnishing equipment to Colombia in that area, the EMBRATEL president believes that "it would be necessary for there to be an evaluation of the capabilities of our

industry, which is now making something for the ground stations, but nothing for the space part."

Training courses for Colombian telephone operators in Brazil were also offered by EMBRATEL to TELECOM, which is to send the first personnel selected to Rio in 78. The agreement aims at preparing human resources for operating the new international telephone exchange acquired by that country from Standard Electric, similar to the one used by Brazil since 1971. Yesterday the Colombian delegation returned to Bogota.

EMBRATEL/ENTEL

For a second meeting in less than 30 days with directors of the Empresa Nacional de Telecomunicaciones (ENTEL), the president of EMBRATEL embarks today for Buenos Aires, where he will work out more details of the program developed by the two state enterprises for connecting the microwave systems of Brazil and Argentina, with a view to facilitating transmissions televised from the Copa do Mundo and expanding the permanent capacity of the communications services of the two countries exclusively by the Intelsat satellite.

Correa de Mattos admitted that "there have been some changes in the work schedules, but all the work will be completed in March 1978 without fail." Explaining that his trip to Argentina is not connected with deadlines, he emphasized that "the Brazilian part, the repeaters necessary to extend the EMBRATEL systems to Foz do Iguacu, is now practically completed and in the technical acceptance phase, while the Argentine part, where the area to be covered is larger, three or four stations are lacking."

Agreement

The agreement signed between EMBRATEL and ENTEL in August 1975 provides that their microwave ground networks will be interconnected by a border link, by means of repeating stations in the cities of Foz do Iguacu and Puerto Yguazu, about 10 kilometers apart. That system will add to the current resources 1,800 telephone circuits and two channels exclusively for television, which will act as an option to the international satellite in the contacts between the two countries."

7428
CSO: 5500

AMATEUR RADIO OPERATIONS IN CUBA SURVEYED

Havana VERDE OLIVO in Spanish 23 Oct 77 pp 42-43

[Article by Aurelio Rodriguez Valdes]

[Text] There have been amateur radio operators in Cuba for as long as there has been radio communication. At the beginning of the 1920's, there were already people in Cuba who conducted experiments with this new and fascinating form of communication by means of electrical devices which required no wires or telegraph lines.

Those first radio buffs did not have many resources: they used dry cell batteries and acid accumulators to supply the electricity they needed for their primitive equipment. This equipment consisted of one or two tubes, coils, condensers and other parts which the operators built themselves. This equipment enabled them to communicate with other operators in the area. When two operators in different places managed to make contact, it was really an event. And if they succeeded in going beyond Cuba's coastal borders and communicating with other radio buffs abroad, that was truly an extraordinary happening.

In 1922 the first commercial radio station opened in Cuba, with the call letters PWX. It belonged to the Cuban Telephone Company. At that time there were already many small radio stations in Cuba which had been built by amateur radio operators in order to learn more about the secrets of radioelectric science. Some of them abandoned this hobby to devote their time to commercial efforts with their stations, and their small plants soon became commercial transmitters.

Among those who could be called the pioneers of Cuban radio, who were amateurs first, was the musician and composer Luis Casas Romero, who converted his station 2-LC to COCO. But many of these pioneers continued to be involved in this scientific entertainment, and eventually formed a great family of transmitters throughout the country.

The radio stations during those first years did not have assigned frequencies or bands of frequencies (at that time the concept of "wave-length" was prevalent). There was a great deal of confusion in the radioelectric aspect of communications, made worse by the lack of selectivity of the receivers.

Measures were taken in official circles to organize this service; on the one hand, there were commercial radio transmissions, and on the other hand there were private transmissions on the part of radio buffs. Regulations were made, standards were set, and licences were issued for the operation of the stations. Later it was necessary to regulate radio transmission and private radio experimentation services, and to create departments to handle the documentation and red tape involved in the proficiency exams, licencing, and observation posts to ensure that the assigned bands were used in accordance with international agreements.

The hobby of radio operation was growing in popularity. By 1928 radio enthusiasts, who had access to books and technical magazines which provided them with extensive information and experience, had formed their first organization, the Radio Club of Cuba.

When Cuba officially entered the Second World War, the government partially suspended the activities of radio buffs and tried to form an emergency corps among them. However, this plan never materialized, and thus the suspension of this type of activity was total, including the occupation of transmitting stations. During the war years, the amateur radio bands were inactive as far as the amateurs were concerned, and were used by the armies involved in the war for their communications. In 1946 the stations were reopened and the first proficiency exams of the post-war period were held. Hundreds of people took these exams.

Thanks to the personal efforts of radio buffs in Cuba, the hobby developed further; the state never provided any aid or cooperation before the triumph of the Revolution. In the most remote corner of the island there was an antenna which broadcast a message of human solidarity; there was an amateur radio operator there who was ready to lend a hand whenever he was asked or whenever circumstances required it. Thus, during times of natural disasters as well, the radio buffs of Cuba have organized and continue to organize their "emergency chains," facilitating communication with the affected areas.

The history of radio operation is full of beautiful stories of radio buffs who have participated in sea rescues, floods, earthquakes, cyclones and other disasters in which many lives have been saved thanks to their timely intervention, their calls for aid, and hundreds of alert ears tuned in to broadcasts.

The people of Cuba have on many occasions heard of this hobby; they are vaguely aware of its existence. They know that radio operators are willing to help out in any civil defense situation, as well as cooperate among scientific and technical circles in the field of communications. They are willing to serve the basic rural high school programs, as well as the cane cutters' camps during the sugar harvest, etc.

Today, in keeping with its tradition and the fundamental principles which form its basis, the hobby continues to play an important role in society. Today more than ever, radio equipment is made available to serve the people and to strengthen more and more the ties of sincere friendship among the radio operators of the world. Radio antennas are carrying the message of international solidarity to the people of Cuba.

The Federation of Cuban Radio Operators will hold its First Congress this year on 27, 28, and 29 October. Its main bodies, the Radio Circles and the preparatory committees for the congress are paving the way for a better organization of the event. This congress, through discussion and deep analysis, will produce the agreements which will establish the goals of the next few years, the best methods of leading and organizing the membership, the activities to be carried out this year, the assistance which the federation will lend to amateur radio operators, technical consultations, the interest groups created in the Pioneer Palaces and the Military Patriotic Front, technical publications, the various services which the organization will provide for its membership, and the ways in which it can become more and more useful to the Revolution and to the people.

8926
CSO: 5300

DEFICIENCIES IN TELEPHONE, TELECOMMUNICATIONS IN ARAB WORLD OUTLINED

Beirut AL-HAWADITH in Arabic 9 Sep 1977, p 47

[Unsigned Article in the Economic Section: "The Arab Telephone is Weak and Inefficient"]

[Text] Economic Events

> From the Atlantic Ocean to the Persian Gulf and from the desert to the coast the Arab telephone is weak and inefficient. The Joint Arab Satellite Authority earmarked $200 million to build a telecommunications network between the countries of the Arab world.

Three months ago Dr Paul Khallat, General Director, the Ilyan Organization exiled in Athens during the war, came back to study the possibilities of returning to Beirut. As he tried to use the telephone to set up meetings to ascertain the general situation in the country to help him reach a decision on whether to stay in Athens or return to Beirut, there was not a single telephone line available. Dr Khallat was forced to send a private messenger to set up the time for what became clearly unnecessary meetings because his decision was to stay in Athens, since without a telephone in working condition no work could be accomplished in a steady manner.

From the abundant statistics on the telecommunications network in the Arab world, Egypt ranks first as far as the total number of telephone lines with 503,200 lines, followed by Lebanon with 227,000 lines, then Algeria with 250,424, and Oman occupying last place (3,700 lines); Northern Yemen comes before it with 4,698 lines.

This does not mean that Egypt, with its population of 35 million, is the first in this field among the Arabs. What is important is knowing how many wires are available for every 100 persons, and also what is the percentage of automatic lines and the kinds of services available.

In the area of percentage of lines available for every 100 persons, Kuwait ranks first (128,750 lines) with 12.8 for every 100 people, followed by Bahrain with an average of 9.86 lines for every 100 persons. Lebanon occupies third place with 8.39 lines. Also in this area, Northern Yemen occupies last place with an average of .09, less than one line for every 10,000 persons.

At the level of network type, there are only five Arab countries with complete automatic telephone systems. They are: Kuwait, Qatar, United Arab Emirates, Oman and Bahrain. Only two countries with more than 90 percent of their lines are automatic, Iraq (94.7 percent) and Tunis (92.9 percent). Also another two countries, Algeria and Morocco, have more than 80 percent of their lines automatic. Statistics for the other countries are not available.

At the service level, countries with an automatic network do have good or satisfactory local service, but at the national and international levels where communications are still weak, service is often less than satisfactory. With the exceptions of Morocco, Tunis and Algeria who were connected recently with the network of the majority of the Western European countries, it is rare to find a direct automatic connection between the Arab countries and other states. Even Lebanon, whose economy is characterized by foreign relations, especially with Western Europe, does not have a direct automatic connection except with France and with only a very limited number of lines.

At the same time, all of France can communicate directly and automatically with any line in Lebanon, unless the Northern Sea cable which connects the two countries is out of order, which happens quite often. It is curious that Libya, which established an automatic network with several European capitals, stopped using it and instead maintained communications through the general switchboard, which takes a very long time.

Recently, only a few weeks ago, the Egyptian Prime Minister, Mamdouh Salim, inaugurated a new network with direct lines between Cairo and several European capitals. In the meantime, Syria, in communicating with the outside world, still has to go through Lebanon's sea cable.

What is most curious of all is that, at the service level supplied by the network, communications between all the European centers and Lebanon during the peak of the war period were easier than the communications between many of the Arab countries and the same European centers. This probably is one of the reasons why the Lebanese said of Lebanon: "Nothing better than Lebanon, even during war time!"

Although this is somewhat of an exaggeration, it is justified after comparing [Arab countries]. As one Egyptian expert believes, one factor in solving the transportation problem in Cairo is improving the telephone services, because such services are in such a poor state that people are obliged to use cars to do the simplest errands that could be accomplished by telephone. This situation is being repeated now in Lebanon, whose telephone services were better during the war than in the present peace time.

This fluctuation in the level of telephone services between average and poor, besides the lack of enough lines, shows the weak condition of the Arab telephone system. It is very limited in size, so that the good parts in the system are a numerically very few cases in a vast desert--a situation that needs immediate quantitative and qualitative development. Otherwise the telephone system and the telecommunications services between the countries in the region and between them and other parts of the world become obsolete and unable to keep up with the increasing needs of the business sectors, the individual and society.

In fact, few steps in the needed development have taken place though the Joint Arab Satellite Organization in Riyadh commissioned a consultant group of Arab, European and American companies to draw up plans to establish a satellite communications network between the Arab countries. It would have included three satellites and estimated to cost $200 million.

This is not the first time that the Arab countries have tried to deal with this kind of project. Previously some countries implemented several projects either individually or jointly; also previously, most of the Arab countries planned to use land communication stations before reaching an agreement on the development of a satellite network between them known as "Arabat." The latter station was estimated to cost $86 million.

Some of these stations cover the Atlantic Ocean region. They were established in Algeria, Morocco, Egypt, Sudan, Saudi Arabia, Kuwait, Bahrain, Iraq and Jordan. The other stations cover the Indian Ocean region. They were established in Lebanon, Jordan, Kuwait, Bahrain, Iraq, Saudi Arabia, Oman, Qatar, Dubai and Ras al-Khaymah.

Until the planned new project and other related projects are carried out, telephone and telecommunications services in the Arab countries will remain weak. This is reflected in the following statistics:

Telephone Systems in the Arab World (1)

	Total Lines	Number of lines per 100 people	Percentage of Automatic Lines
Egypt	503,200	1.34	Insufficient
Lebanon	277,000	8.39	Insufficient
Algeria	250,424	1.46	81.6
Morocco	198,500	1.15	83.6
Iraq	184,924	1.69	94.7
Syria	143,320	1.95	Insufficient
Kuwait	128,751	12.80	100.00
Tunis	126,750	2.26	92.9
Saudi Arabia	84,650	1.00	Insufficient
Jordan	61,000	2.56	Insufficient
Sudan	50,944	0.29	Insufficient
U.A.E.	44,278	7.29	100.00

Libya	41,490	1.99	Insufficient
Bahrain	26,228	9.86	100.00
Qatar	20,908	1.39	100.00
S. Yemen	9,876	0.63	Insufficient
N. Yemen	4,698	0.09	Insufficient
Oman	3,701	0.25	100.00

Telephone Systems in the Non-Arab Middle East (1)

	Total Lines	Number of Lines per 100 People	Percentage of Automatic Lines
Turkey	1,011,790	2.02	79.0
Iran	688,396	2.00	92.0
Cyprus	71,394	11.17	100.00
Ethiopia	68,894	0.25	88.0
Afghanistan	20,960	0.11	Insufficient

(1) All the numbers in both schedules are not precise estimates collected at the end of 1975, except for Jordan and Libya (1971), Lebanon (1972), Southern Yemen (1973), Saudi Arabia, Sudan and Syria (1974).

9125
CSO: 5500

BRIEFS

COOPERATION AMONG AFRICAN STATES--Broadcasting executives from east, central and southern Africa--members of the Commonwealth Broadcasting Association--agreed in Nairobi today to a major plan for their cooperation of radio programs in each of the countries in the region next year. Mixed production teams will be sent to all the countries to produce programs highlighting development and cultures of various peoples of Africa. The project is intended to help the countries know each other better through the broadcasting of the programs. The agreement was reached after a 7-day meeting in Nairobi which ended today. The meeting also discussed training, bilingual and multilingual broadcasting, television development, radio and television coverage of the 1978 commonwealth games in Canada, and audience research. [Text] [Nairobi Domestic Service in English 1600 GMT 25 Nov 77]

CSO: 5500

NEW ORBITA STATION PROVIDES SATELLITE LINK WITH MOSCOW

Yerevan KOMMUNIST in Russian 5 Nov 77 p 4 LD

[Article by Yu Kozlov, deputy of communications of the Armenian SSR: "In the 'Orbita' System"]

[Excerpt] On the eve of the glorious jubilee--the 60th anniversary of Great October--it became possible for the inhabitants of Yerevan and Aratskaya Valley to watch Central Television's fourth program transmitted on Channel 5 on their television screens.

This became possible after the "Orbita-2" station in Yerevan became operational. This insures the republic's constant and reliable link via the Moscow-earth satellite-Yerevan channel.

In addition to the existing surface and underground long distance communications lines linking Yerevan with Moscow, Armenia, from now on has a stable, high quality communications channel with our motherland's capital via the "Molniya" artificial earth satellites.

Today with the help of the Yerevan Space Communications Station two additional Central Television programs are already being received--the fourth and the "Orbita" program, which basically repeats Central Television's first program with a 3-hour time lag, these transmissions are received in color. Via the "Orbita-2" station the republic received radio broadcasts from Moscow with the apparatus making it possible to pick up these programs in stereo. By the end of the year, with the commissioning of the transmitting part of the entire complex, it will be possible for the Yerevan television studio to broadcast on Central Television and the intervision network.

Satellite communications capabilities are increasing yearly. By 1978 the space communications station will receive direct telephone and telegraph channels with Moscow.

An extremely important virtue of space communications is the ability to transmit photocopies of central newspapers from Moscow directly to the

printers of the Union Republic capitals and remote towns of the Soviet Union. By means of the high speed "Gazeta-2" installation, a newspaper page from PRAVDA will be transmitted from Moscow to Yerevan in only 2.5 minutes. This will make it possible for the inhabitants of Yerevan to get the central papers at the same time as the Muscovites.

"Orbita-2" in Yerevan has yet another important purpose--by means of surface radio relay lines the Central Television programs received via SPAE will be retransmitted to the fraternal republics of Georgia and Azerbaijan. In the future the Yerevan-Moscow space channel will transmit increasingly more information and its capabilities will be expanded and improved annually.

CSO: 5500

BRIEFS

KOMSOMOLSK TV DEVELOPMENT--This year the Kosomolsk-Na-Amure radio and television center has completely renovated its equipment and studio complex by installing new modern equipment. Construction of a new television transmitting station with a 250-meter tower has begun. It will permit an improvement in the quality of black and white, and particularly color television transmissions, while the zone of stable reception will nearly double. The station will be commissioned in 1978. [Khabarovsk Domestic Service in Russian 0900 GMT 22 Nov 77 OW]

CSO: 5500

BRIEFS

SPANISH-PORTUGUESE NEWS COOPERATION--Spanish Radio and Television are to open offices in Lisbon for the news coverage of the country. The teams will be led by Spanish reporters and it is expected that Portuguese citizens will also be employed and count on the cooperation of Portuguese Radio and Television. [as heard] According to news given by the Portuguese news agency ANOP, based on statements by the Spanish reporter to lead the first team, Spain also intends to provide direct news coverage on African affairs from Lisbon which, he said, was a good observation point for Africa. [Text] [Lisbon Radio in English to Europe 2030 GMT 15 Nov 77 LD]

CSO: 5500

REPORT ON CYPRUS TELECOMMUNICATIONS AUTHORITY

Nicosia CYPRUS MAIL in English 17 Nov 77 p 1

/Text/ **CYPRUS WILL HAVE ITS OWN SATELLITE EARTH STATION IN TWO YEARS TIME, THE CHAIRMAN OF THE CYPRUS TELECOMMUNICATIONS AUTHORITY MR NICOLAOS S. ROUSSOS ANNOUNCED AT A PRESS CONFERENCE YESTERDAY WHEN HE PRESENTED CYTA ACTIVITIES AND PLANS FOR THE FUTURE.**

The station will provide direct communication with countries provided with the same facilities, will ensure alternative channels of communication, and will contribute towards the development and improvement of telecommunications and television.

He estimated the cost to be in the region of £2.5 m. to £3 million.

This is a large project and the Authority's technical department is working out the specifications on the basis of which international tenders will be invited for consultants who will prepare the final study for the construction of the project.

Mr Roussos mentioned that tenders from consultants are in hand and were being evaluated. He hoped that by yesterday the Board would select the consultants who will be assigned the task of preparing the final study.

The CYTA Chairman announced that the Board had decided to name the new station «Makarios The Third» in memory of the late President who had associated himself with the progress of the country in general.

Mr Roussos said that Cyprus, despite its small size, was among the most advanced countries of the world in the field of telecommunications.

Cyprus is now connected with 54 countries by «international subscribers dialling» (ISD) and holds fourth place after Australia (with 62 countries), U.K. (with 60 countries) and Switzerland (with 56 countries).

When in September 1976 it was connected with 38 countries, it occupied first place compared with other countries at the time, and at the end of 1976 when it was connected with 39 it held second place among the ISD privileged countries.

In addition, by the end of 1976, the island was connected by semi-automatic telephone service with another 13 countries (today with ten only) and manually with 78 countries (now with 76).

Telex services

Moreover at the end of 1976 Cyprus was connected automatically by telex service with 94 countries (today with 103) and semi-automatically with 107 (now 98).

During the year the Authority had to cope not only with the increased demands created by disruption caused by the Turkish invasion, but also with the additional requirements from foreign businessmen and citizens who came to Cyprus after the Lebanese events.

«These visitors expressed their favourable impressions and unreservedly paid tribute to the Authority for the facilities provided», he said.

Mr Roussos pointed out that the telecommunications needs of the State, the National Guard and the U.N. Peace Force were fully met.

Among plans ahead are the reactivation of the high frequency international radio link with Israel, the installation of new equipment for the improvement of ship-to-shore and civil aviation services, and the increase of the number of telephone lines.

Surplus

The year 1976 ended with a surplus of £1.4 million, very close to that of 1973 but in very sharp contrast to the £184,939 deficit of the 1974 invasion year and £157,520 of the year after. Indications for 1977 are that the surplus will be even higher than that of last year.

The Chairman referred to the Authority's «prudent financial policy» of sound and productive development and to the cooperation of the staff and said:

«These facts are conducive to hopeful forecasts that it will be possible to carry out the Authority's future development plans with ample financial ease, taking into consideration also credit facilities given to the Authority by suppliers abroad», among whom the authority's credibility is at a high level.

CSO: 5500

CYTA CHAIRMAN CITES TELECOMMUNICATIONS PLANS

Nicosia Domestic Service in English 1830 GMT 16 Nov 77 NC

[Text] The chairman of the Cyprus Telecommunications Authority [CYTA], Mr Roussos, has said the island is expected to have an earth satellite station in 2 years' time. Speaking at a press conference today, he said the station would provide alternative channels and help in the improvement and development of communications and television. He said that CYTA was in close contact with the Cyprus Broadcasting Corporation in connection with the construction of the station. Mr Roussos said the project was estimated to cost between 2.5 and 3 million pounds. He announced that the authority has decided to name the satellite station after the late president of Cyprus, Archbishop Makarios.

Mr Roussos said that, despite its small size, Cyprus is among the most advanced countries of the world in the field of telecommunications. It is connected with 54 countries by international subscribers dialing and it is also connected automatically by telex with 103 countries.

CSO: 5500

BRIEFS

TELECOMMUNICATIONS PLANS--The chairman of the Cyprus Telecommunications Authority [CYTA], Mr Roussos, has said the island is expected to have an earth satellite station in 2 years' time. Speaking at a press conference today, he said the station would provide alternative channels and help in the improvement and development of communications and television. He said that CYTA was in close contact with the Cyprus Broadcasting Corporation in connection with the construction of the station. Mr Roussos said the project was estimated to cost between 2.5 and 3 million pounds. He announced that the authority has decided to name the satellite station after the late president of Cyprus, Archbishop Makarios. Mr Roussos said that, despite its small size, Cyprus is among the most advanced countries of the world in the field of telecommunications. It is connected with 54 countries by international subscribers dialing and it is also connected automatically by TELEX with 103 countries.[Text] [Nicosia Domestic Service in English 1830 GMT 16 Nov 77 NC]

CSO: 5500

FINNS WEIGH JOINING NORDSAT

Communist Paper: NORDSAT Is Capitalist Network

Helsinki KANSAN UUTISET in Finnish 29 Oct 77 p 7

[Text] Always when public radio needs money, the conservative press raises a united outcry: not a penny more, cut-backs, more commercial programs, rationalization!

In recent months, the conservative press seems almost to have forgotten public radio. Even more has been written about NORDSAT, a joint Nordic public radio satellite venture. And poverty and pain has been far away from that prose.

Is it for American films that the conservative papers are trying to get that satellite into the heavens? Of course not, it is a question of something much more noble: Nordic cultural cooperation.

Somewhere a dog is buried.

What We Could Get From the Satellite...

The satellite could bring to every Nordic country ten television programs and 12 to 16 radio programs simultaneously. The TV program watcher could select his desired language for sub-titles. In other words: offerings would increase. But would we then watch more Swedish, Norwegian, or Danish programs, or would we listen to more music of these countries?

Doubtfully.

In all Nordic countries, about half of the TV programming is compiled from foreign programs, of which the greatest share is from the United States and England. The portion of this Anglo-American entertainment is even relatively greater in other Nordic countries than it is in Finland. For example, the number of film programs originating in the Soviet Union and other socialist countries in those nations is very small compared to Finland.

In practice, the satellite would mean first of all, that in Finland as well as in other Nordic countries, watching programs produced in Western entertainment factories would increase sharply--it is easy to change the channel in accordance with where a white Indian is having an adventure. Studies, which have been made here as well as elsewhere, of the behavior of the TV audience, show that when the selection of programs is increased, they are used to good advantage--in that there is an attempt to select entertainment continually from wherever it is available.

Or: very few of us would watch plays by Strindberg or Ibsen any more than we do now. More of us would leave unwatched even those Nordic plays which we watch now when there is something less interesting on the other channel.

What about radio then? If there was always some interference-free popular music being offered, many would neglect to listen to those information programs which currently sometimes catch the ear between music programs.

And What Would We Pay for It?

According to cautious--according to many experts, too cautious--estimates, the consumer himself would have to add gadgets costing about 2,500 markkas to his television set in order to watch satellite programs. A color receiver making possible satellite reception is estimated--according to current price levels--at about 5,500 markkas.

And the satellite is not very cheap either. According to a cost estimate by the Swedish Rymdbolaget AB (OY Avaruusyhtio) made for the Nordic Council, the launching of two satellites plus necessary ground stations would cost over 500 million markkas. Finland's share of this would be one-fifth. Operating costs of this activity have been estimated at about six million markkas per year. Rymdbolaget estimates the useful life of the satellites at seven years, after which a half billion would be needed again.

Rymdbolaget maintains good relations with Swedish electronic industries as well as space officials of the United States. Other experts--for example Swedish radio technical specialists--regard Rymdbolaget's cost estimates as low.

Also it has been observed that the useful life of the satellites is apparently closer to four years than seven years. In other words: a half billion would have to be shot into the heavens much more often than claimed by Rymdbolaget.

Rymdbolaget has also forgotten one essential detail which affects the cost estimate: according to statistics, every fourth satellite launching attempt is unsuccessful. The failure rate is thus quite great and there is cause to add for the risk--twenty five percent.

And who pays for this? We taxpayers, of course. Without reason, the Finnish Ministry of Finance has urged postponement of satellite procurement at least

until the latter half of the next decade. There will be more important uses for tax revenue in this country in the near future.

Because television watchers would enjoy four times as many programs as compared to today's programming, share holders in the electronic industry would haul in profits ten-fold.

Why Do News Magnates Want NORDSAT?

The Nordic Council has asked numerous organizations and establishments for their opinion on satellite procurement. Public radio has just revealed its reserved stand, in which they refer to a need for a thorough clarification before there can be any talk of a decision. Similar stands probably can be expected from other Nordic radio companies.

Stands taken publicly by Nordic newspapermens' organizations thus far have been negative on the procurement. The central organization of Swedish trade unions has announced that it opposes the procurement and has noted that the funds could better be used to support the press.

Supporters of the satellite plan on the other hand have been owners of Finnish newspapers and magazines. For love of Nordic cultural cooperation? Very doubtfully. Now cable television steps into the picture--through use of cable networks, distribution costs of satellite reception can be decreased.

Satellite broadcasts can be thought to increase willingness to broaden existing cable networks and the building of new ones in such localities where cable companies now exist only on the books of company registers. And who are the main shareholders of cable television companies? The news magnates of course.

Who Benefits From the Haste?

At the beginning of the year, an international meeting of public radio satellites was held in Geneva where different countries were allocated their own satellite areas. The main principle was that every country would have the possibility for the use of her own satellite. In Europe, only the Nordic countries plan a joint satellite. The Nordic decision can be defended on reasons of cost but at the same time it chips off a goodly share of our national right of self-determination. Whose needs are served by surrendering a part of our right to determine our radio and television programs to Norway and Denmark which belong to NATO?

The haste with which the NORDSAT procurement has been carried forward, brings up additional questions. In no country of Europe are plans for the use of satellites as far along as in the Nordic countries.

At present, there is no international set of rules for the regulation of satellite activity. It is being worked on in the UN--and an agreement will not be reached soon. So far apart, for example, are the stands of the Soviet Union and United States on many central questions.

In this haste it is not a question of Nordic cooperation or even of markets for the electronic industry.

Some are in a hurry to get ahead of all future decisions which will affect the international use of satellites. Why?

Is it only so that the white Indian would come into our homes four times a week?

SKDL Traffic Minister Expresses Doubts

Helsinki KANSAN UUTISET in Finnish 1 Nov 77 p 1, 6

[Text] According to Traffic Minister Veikko Saarto, broad discussions must be held about freedom of information before final conclusions are made about a joint Nordic radio and TV satellite.

There is reason to start a discussion about freedom of information as a part of freedom of opinion for the fundamental improvement of the position of the opinion press, said Saarto while speaking in Helsinki yesterday.

The Finnish Newspapermens' Union (SSL) regards the clarifications made about the TV satellite as insufficient for decision making and yesterday demanded that additional national and Nordic investigations be conducted. The SSL also regards the proposed schedule as too optimistic.

In a fresh statement, the Nordic newspapermen's union also criticizes the conclusions of the committee of state secretaries. In the opinion of the union, which represents 20,000 newspaper and radio journalists, the satellite procurement has nowhere nearly been thought through and is not a necessary alternative.

The chairman of the Peoples' radio union, Representative Mikko Ekorre (SKDL) also feels that the satellite procurement is not ripe for carrying out. Ekorre comments in an article in the new Viestin paper of the Peoples' radio union on the effects of the satellite procurement on program policy and recommends a very reserved attitude. In addition, the procurement is too expensive to carry out, he says.

Speaking on Monday in Helsinki, Traffic Minister Saarto said that through a discussion on information, we must seek answers to such questions as to how we protect the exchange of information on deliberations about job seeking, sufficient income, social security and spiritually rich leisure time activity from a base of national cultural values.

On the opinion press, Saarto said that as long as more financial support is not found from society for this first-class important protector of freedom of opinion, it is difficult to imagine a situation where "state funds would be earmarked for shooting into the heavens."

Conservative Party Urges Finland Participate

Helsinki HELSINGIN SANOMAT in Finnish 30 Oct 77 p 10

[Text] It would be beneficial for Finland to take part in the construction and use of the joint Nordic radio and TV satellite (NORDSAT).

Thus said the coalition party administrative board in a statement on the joint Nordic satellite procurement.

The leading opposition party, the coalition, regards the principle of freedom of information presupposing thet technical advancements be used in the service of multi-valued information distribution. "With the aid of the joint Nordic satellite, Finland would be offered the chance to take advantage of many more television and radio programs than currently.

In taking a stand to support the satellite, the coalition stresses the importance of preserving and advancing national culture. According to the coalition, this objective is supported by the possibilities for use of the existing broadcast network in the future as well.

The national coalition is of the opinion that the costs of auxiliary equipment needed for satellite reception, particularly in Finland, can be kept reasonable since in our country we have a broad, good quality and continually developing network of joint antenna systems."

The costs of the joint Nordic satellite procurement have been estimated and preliminary calculations indicate that placing the satellite in its orbit at present cost levels would require about 500 million markkas. The useful life of the satellite is calculated as seven years.

New antennas required for receivers would cost, at present cost levels, a couple of thousand markkas.

7640
CSO: 5500

PTT SELECTS SATELLITE ELECTRONIC CENTER PROJECTS

Paris ELECTRONIQUE ACTUALITES in French 11 Nov 77 pp 1, 6

[Article by D. Levy: "PTT Selects Four Projects for a Satellite Electronic Center"]

[Text] Four satellite electronic center projects submitted by Telic, Jeumont-Schneider, SAT, and the joint venture TRT-TIT-Matra, as well as a line concentrator project proposed by CGCT, were selected at the close of the double invitation for bids initiated at the beginning of the year by the Directorate for Industrial and International Affairs (DAII) of the DGT (General Directorate of Telecommunications). The industrial groups selected for the satellite centers will divide among themselves a study contract of the order of 40 million francs, and will each deliver a prototype within two to three years. The CGCT will also receive a small study contract and will deliver a concentrator prototype.

For both bid items, the DAII action appears to have motivated by the same concept: stimulate the imagination of builders by avoiding excessively rigid specifications for the equipment, and thereby enable the interested builders to each provide devices which will satisfy the requirements of many telephone networks, one of which will be the French network.

By thus breaking with tradition, the DAII will have encouraged the lowest cost -- the development of the equipment will require a large internal contribution on the part of builders -- construction of products "suitable" for exportation, rather than that of systems optimized for the French network and therefore difficult to export.

A Miniselector Concentrator

The study of a new concentrator for subscriber lines answers the need for more modern equipment for the national network and for exportation, which will offer more flexibility than the present system produced by Telic, of which more than 6000 have been installed in the PTT network since 1970.

Specifically, the new system will provide more capacity (up to 300 lines as compared to 60 for the older model), service capabilities for subscriber lines, and more ruggedness under difficult operating conditions.

The CGCT was awarded the study contract for this new concentrator, which did not elicit great interest among builders (few proposals were submitted). The CGCT project is based on the adaptation of the Swiss Gfeller equipment, which will be provided with a miniselector.

After this choice was made, Telic did not conceal that it was developing out of its own funds a line concentrator "whose technology it will own." But does this action not answer the most secret wishes of DAII? Indeed, when one is aware of DAII's haunting fear of monopolies, is it possible to seriously envisage that it would eliminate the monopoly of Telic to give it to CGCT?

Interesting Equipment Prices

The bid invitation for the satellite center, small self-commutator for 4000 lines (8000 line option), was also part of the modernization of the national telephone network (replacement of present Socotel S-1 electromechanical systems with electronic centers) and of exportation needs. It was even suggested that the invitation was an attempt to compete, at least partially, against the E-10 system...

The builders did not fail to see the magnitude of this business (about ten of them submitted their proposals last 15 May). Four of them were selected: Telic, the joint venture TRT-TIT-Matra, SAT, and Jeumont-Schneider, all of which offered the two configurations (4000 and 8000 lines).

As a whole, the cost claims and the performances presented appear very interesting. Still to be seen are the general specifications for the operation of the satellite centers (adaptation to network specifications) which have not yet been presented by the contractors. As we have said, this "omission" results from the priority given to exportation.

Credits of the order of 40 million francs will be divided among the four contractors, each of which will deliver a prototype within two to three years after the contracts are signed. However, it is not impossible for one of the eliminated contractors to also receive credits for their own equipment development. After receiving the prototypes, PTT reserves the right to order one or the other of the products for mass production. But they can all be offered for exportation...

Of the selected proposals, the one from Telic is based on its private centrals (Y models), on space technology, and a thyristor connection point. After examining a "Delta" technique, the TRT-TIT-Matra group (named MATRIT)

proposed a MIC configuration (PTT would resign itself to accept a Delta modulation in the terminal portion of the equipment, but not in the network). True to its options, SAT proposed a product using modern technology, but with a concentration of PAM for reasons of economy. And finally, Jeumont-Schneider proposed an original advanced solution using integrated coders-decoders. These circuits are available in the United States at 8 kHz but not at 24 kHz. A French development is foreseen for the latter. While this solution (PAM concentration and MIC channel mixing) is very interesting as we have seen, it nevertheless entails some risks.

11,023
CSO: 5500

BRIEFS

INTELSAT CONTRACT FOR MATRA--The international organization for telecommunication satellites, Intelsat, has decided to award a study contract of 155,000 dollars to the Matra corporation. Within the terms of this 16-month contract, the French firm will study stabilization and orientatio systems to be used by future satellites. More specifically, the Matra corporation is charged with the study and development of an altitude sensor which will undergo a series of evaluations before its eventual use in the future generation of geostationary satellites Intelsat VI, planned for the 1990 decade. For Matra this constitutes an international recognition of one of its specialties (stabilization systems) in space technology. It falls within the framework of technical study contracts awarded by Intelsat to manufacturers specializing in particular sectors of satellite construction. In France, such contracts have already been awarded to Thomson-CSF, SAT, and Aerospatiale. [Text] [Paris ELECTRONIQUE ACTUALITES in French 11 Nov 77 p 6] 11023

CSO: 5500

ELECTRONIC CHROMATIC SCANNING, ROTOGRAVURE ROLLER ETCHING DESCRIBED

Principles of Chromatic Scanners Described

Milan TELECOMUNICAZIONI in Italian No 59 Jun 76 pp 31-42

[Article by Gian Paolo Pansieri, of the Italian Siemens Telecommunications Company: "Electronic Chromatic Correction"]

[Text] In the last few years, electronics has found a constantly greater number of applications, including printing processes, with highly sophisticated equipment. The theoretical principles used for producing electronic scanners and some of the main devices used are described in the present article.

1. Introduction

The use of electronic scanners is now quite extensive also in Italy. The Rudolph Hell Company, in Kiel, a member of the Siemens Group, has been in the vanguard of this sector for years and its DC-300 electronic scanner (fig. 1) is one of the most improved types.

The development of this kind of equipment requires, in addition to thorough experience in the most advanced electronic technologies together with high-precision mechanics, also a thorough, extensive knowledge of the problems of printing and of color. This article does not propose to exhaust the great number of matters associated with this method, but rather to give the reader, on the basis of less usual specific topics, an idea of the complexity and vastness of the problems tackled and solved.

2. Color printing is based on the principle that (at least within certain limits) every color is obtained from the overlaying, with suitable densities, of the three primary colors: yellow, cyan (blue) and magenta (red) (fig. 2).

The process of three-color printing is based on this property and can be outlined as follows:

[a.] The color original is examined through three filters: violet, orange and green.

[b.] The black-and-white negatives obtained represent separations of the three complementary colors, that is to say, specifically, yellow, blue and magenta.

[c.] The bases for the various printing procedures (cuts for typographic printing, plates for offset, rollers for rotogravure).

[d.] Printing by overlaying the three bases, inked, respectively, with the yellow, blue and magenta colors and by printing the three superimposed colors, reproduction of the color original is obtained in three colors.

The procedure thus outlined is, however, purely theoretical, since:

[a.] Filters are not perfect and, therefore, allow part of the colors that should be filtered out to pass through.

[b.] Printing colors are not sufficiently pure, but, rather, contain a certain percentage of other colors.

In conclusion, each printing color does not make its own contribution exclusively, but, rather, it also invades the part belonging to the other two colors. Therefore, this results in a reproduction in which all the colors are more or less altered toward brown. In order to avoid this disadvantage, since it is practically impossible to produce perfect filters, a "chromatic correction" phase that will eliminate the bad effects of the imperfection of filters and of printing colors must be incorporated in the process outlined above.

Up to a few years ago, the only means for performing chromatic correction was manual retouching. Photographic masking processes represented, in this field, the first definite step toward automation of the process. In the last few years, a new system has been developed and is experiencing a constantly wider dissemination: electronic chromatic correction.

A three-dimensional representation of the compostion of the various colors present in nature should be resorted to, in order to realize how that works (fig. 3). Starting from the origin, the densities of the three primary colors -- magenta, yellow and blue -- each of which increases from 0 up to a maximum corresponding to the saturated color are plotted on the three cartesian axes X, Y, Z. All the colors obtainable by overlaying the three primary colors are contained within a cube. The vertex, which is at the origin of the coordinates at which we have zero for all three colors, corresponds to white. Three other vertices correspond, obviously, to the three saturated primary colors. Three more vertices also represent the saturated secondary colors obtained by combining the primary colors, namely orange, violet and green, in pairs.

Finally, the last vertex, at which there is overlaying of the three saturated primary colors, corresponds to black. The diagonal joining the white vertex to the black vertex is the line of grays.

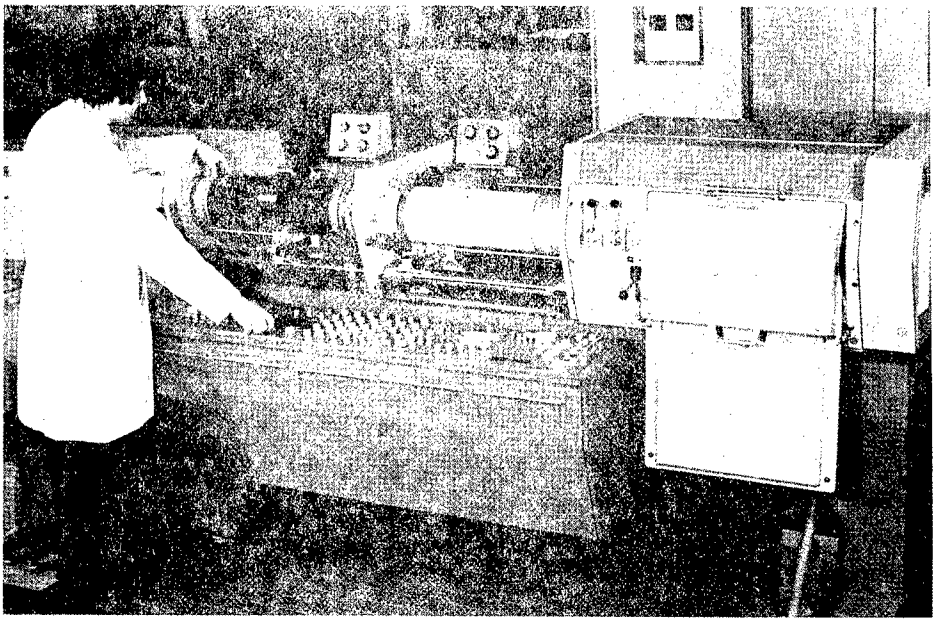


Figure 1. The DC-300 electronic chromatic scanner

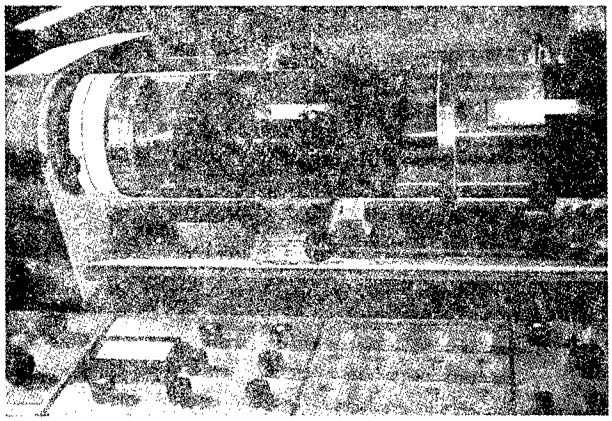


Figure 1a. Detail of the scanning cylinder.

Representation with the cube lends itself especially to an examination of the three-color separations and, therefore, to a study of the problems of chromatic correction. If, in fact, the X-axis is examined, it is seen that magenta, orange and violet have the density value corresponding to black, while yellow, green and blue have the same value of white. These are, threfore, the conditions of a separation of magenta (see figure 2 again).

If the Y-axis is examined, yellow, green and orange have the same density value as black. Magenta, violet and blue, the same value as white (yellow separation). Finally, according to the Z-axis, violet, blue and green have the value of black, while yellow, orange and magenta have the value of white (blue separation).

[Chart not reproducible]

Figure 2. The principle of chromatic separation.

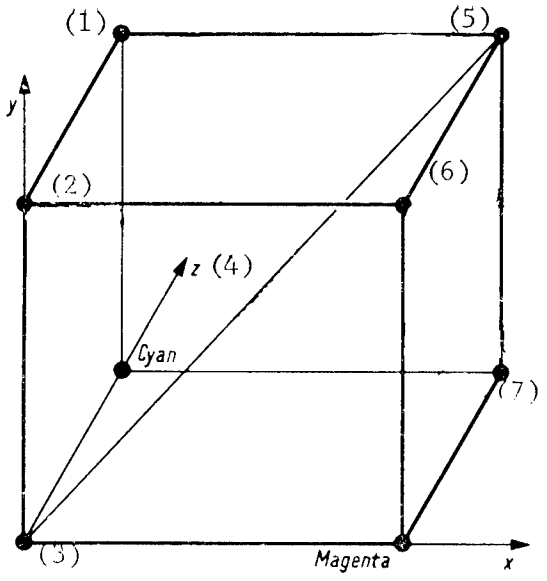


Figure 3. The theoretical chromatic cube.
Key: 1. green; 2. yellow; 3. white; 4. gray; 5. black; 6. orange; 7. violet

Unfortunately, this cubic shape of the chromatic space represents only an ideal abstraction at which chromatic correction aims. In fact, as we have seen, application of the three-color process without correction leads to impure colors.

For example, what should be a pure yellow and, therefore, be on the Y-axis contains a certain amount of blue and magenta, and, therefore, is inside the theoretical cube (fig. 4). The same applies to the other colors.

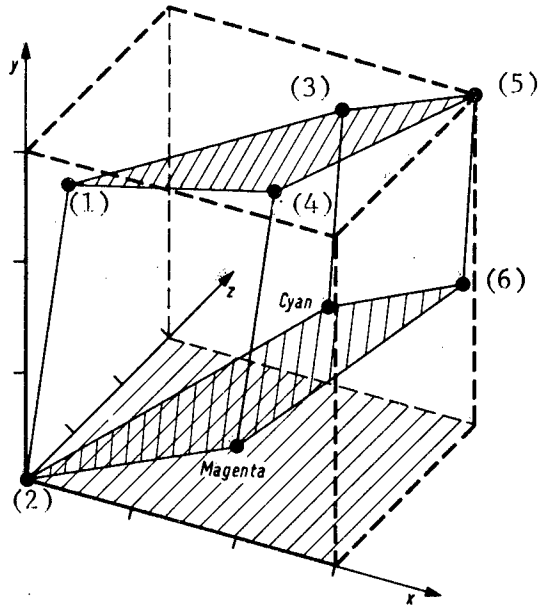


Figure 4. The actual chromatic hexahedron.
Key: 1. yellow; 2. white; 3. green; 4. orange; 5. black; 6. violet

In conclusion, the chromatic space is represented by an irregular hexahedron, rather than by a cube, that we shall call a distorted cube because of its origin. As we have said, the objective of chromatic correction is to bring the distorted cube back to the shape of a regular cube. In order to have an idea of how this is achieved in the scanner, let us take, for example, yellow scanning and follow the various operations needed to attain the objective.

If the distorted cube in figure 4 is projected, for example, on the vertical plane bisecting the X, Z axes, the diagram in figure 5 is obtained. As is seen, yellow, green and orange, which should have the same intensity as black, are somewhat lighter. Magenta, blue and violet, which should have the same intensity as white, are considerably darker.

As a first step for chromatic correction, the magenta mask is used to achieve magenta correction and to bring it to the same density level as white. For this purpose, we realize that a point on the original with a pure magenta color should have no yellow content at all, while actually we have, for example, a yellow equal to 15 percent. By taking the magenta separation and applying to it 15 percent in subtraction for the value of the yellow, the yellow content of the magenta is brought down to the desired zero value.

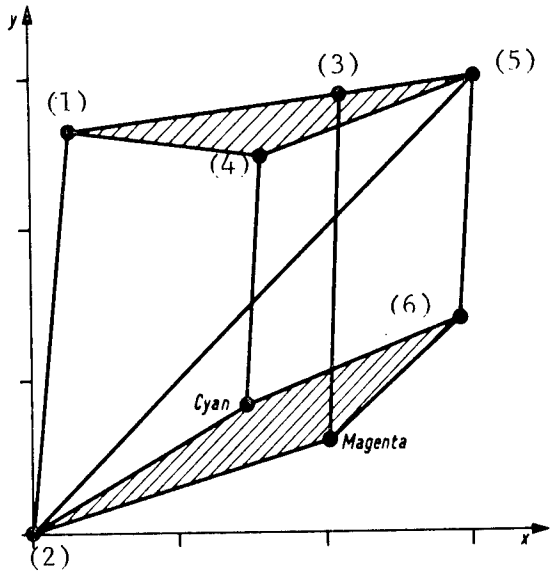


Figure 5. Projection of the actual chromatic hexahedron on the yellow-magenta plane.
Key: 1. yellow; 2. white; 3. orange; 4. green; 5. black; 6. violet

The other colors containing magenta -- violet (as desired) and also orange and black -- are also reduced together with the magenta by means of correction. A smaller reduction of the other colors -- blue, green and yellow -- is also achieved by the secondary action of electronic correction (because filters are not perfect). Finally, the levels of the "black colors" and of the "white colors" take on the appearance shown in figure 6.

In the second phase, the blue mask is used, with which blue is lowered to the level of white and with it also the colors containing blue, that is to say violet (as desired) but also green and black, in addition to magenta, orange and yellow (as a secondary effect). The levels of the "black colors" and of the "white colors" take on the appearance shown in figure 7. As can be seen, correction of the "white colors" was obtained, but the "black colors" have appreciably different levels among themselves.

As a third phase, the level of black is increased, raising the slope of the grapy line until it reaches the level of yellow.

Thus, we have reached the appearance of figure 8.

The green and the orange, however, still have appreciably different levels. The fourth step in chromatic correction consists in "balancing" between green and orange. This is achieved by using again the value furnished us by the magenta and blue masks.

The appearance of figure 9 is obtained in this way.

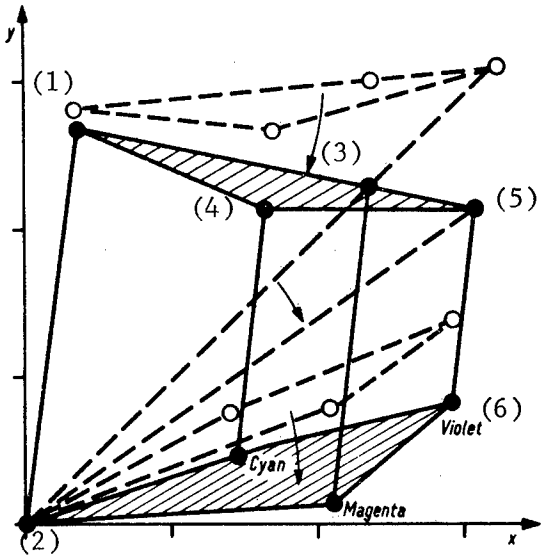


Figure 6. Correction of magenta.
Key: 1. yellow; 2. white; 3. orange;
4. green; 5. black; 6. violet

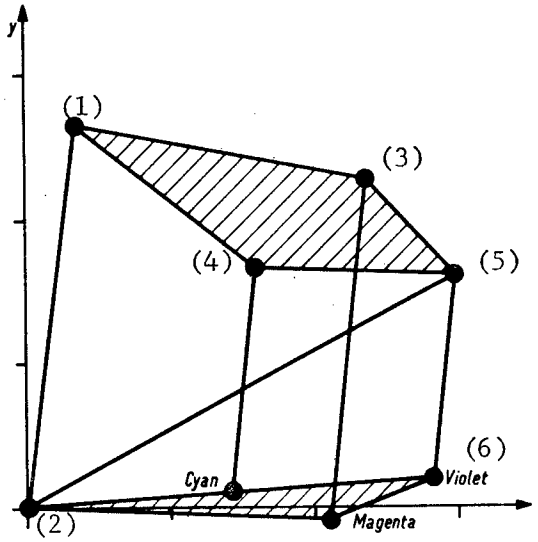


Figure 7. Correction of blue.
Key: 1. yellow; 2. white; 3. orange;
4. green; 5. black; 6. violet

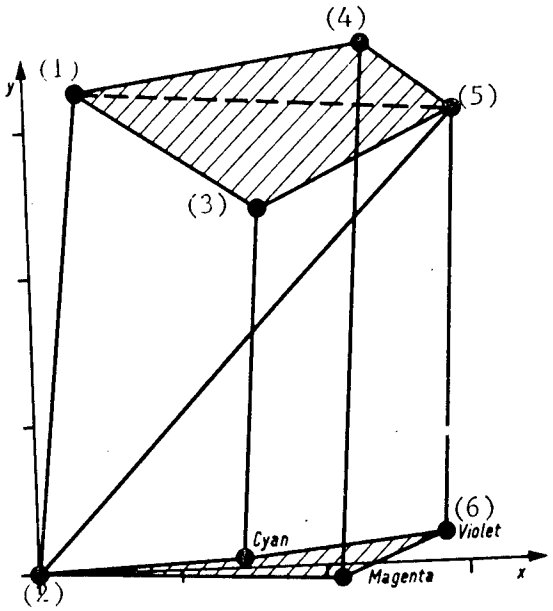


Figure 8. Yellow-black leveling.
Key: 1. yellow; 2. white; 3. green;
4. orange; 5. black; 6. violet

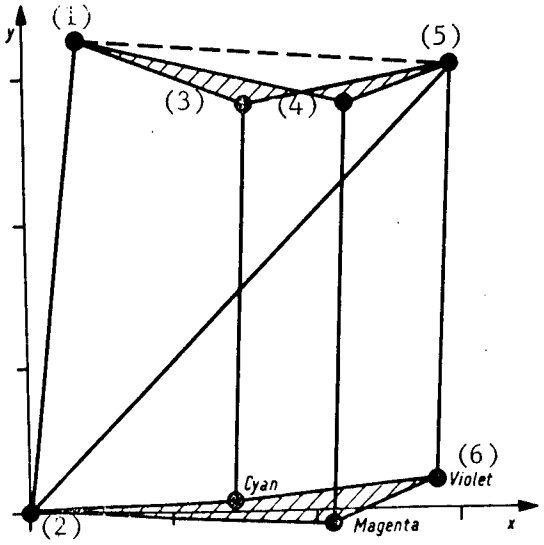


Figure 9. Green-orange balancing. Yellow scan corrected.
Key: 1. yellow; 2. white; 3. green;
4. orange; 5. black; 6. violet

Thus, it is possible to bring all the "white colors" to about the same level and all the "black colors" likewise to about the same level and the chromatic correction is completed. It will suffice, as fifth and final operation, to adjust overall the levels of the "white colors" and the "black colors," in order to attain the levels required for subsequent processing.

The same operations are repeated for the red and blue separations.

Naturally, these calibrations are performed once by the operator before starting scanning and chromatic correction, which take place automatically, since the electronic computer incorporated in the scanner takes care by itself of making the corrections to be applied, point by point.

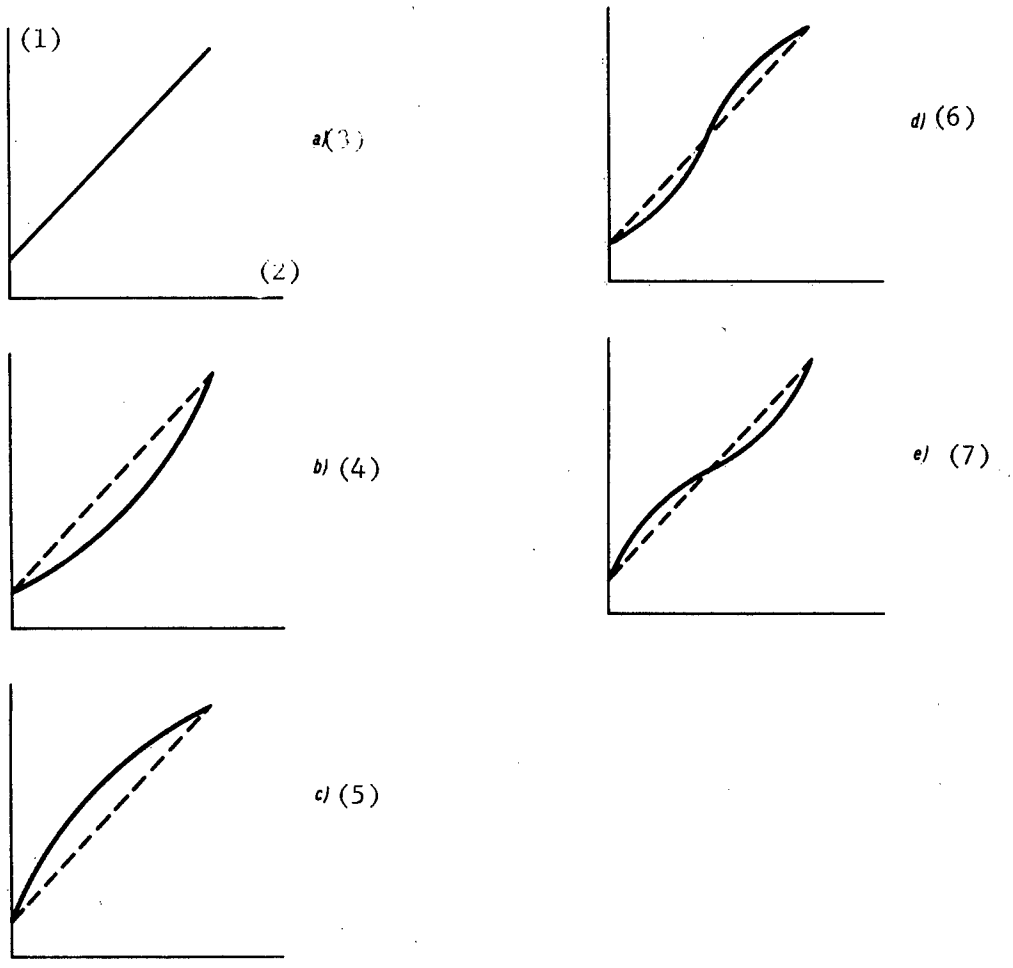


Figure 10. The gradation curves.
Key: 1. Density of the reproduction; 2. density of the original; 3. "linear" gradation; 4. "light" gradation; 5. "dark" gradation; 6. "contrasted" gradation; 7. "soft" gradation

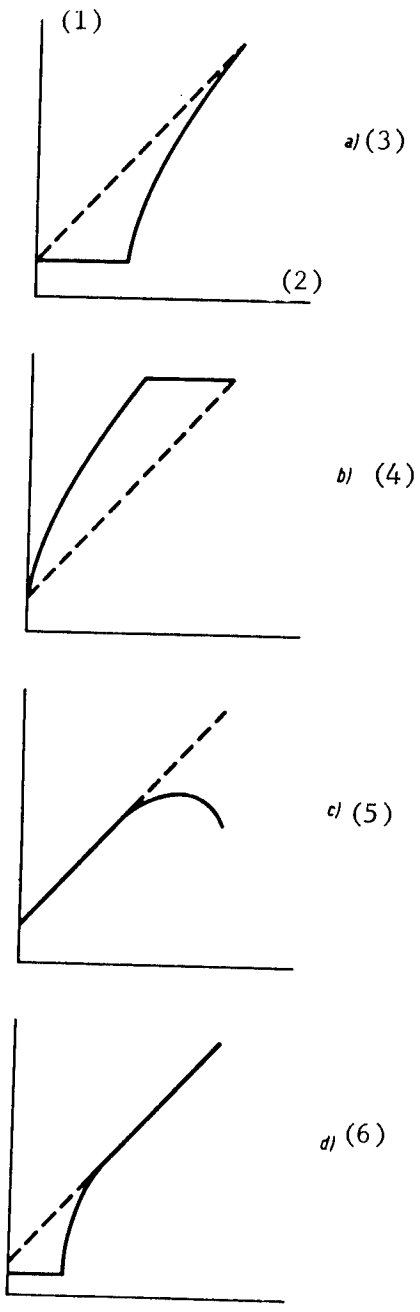


Figure 11. Special gradation curves.
Key: 1. Density of the reproduction; density of the original; 3. limitation of whites; 4. limitation of blacks; 5. declining curve; 6. increase of high lights

3. The Gradation Curves

The possibilities of electronic chromatic correction are not limited to a modification of the chromatic space by means of shifting the vertices of the distorted cube. Electronic correction also makes it possible to modify at will the gradation curve, that is to say the tone response curve, making it possible to obtain, for every color, a lighter or darker, softer or more contrasted response, as well as combinations of them (figure 10).

It is also possible to obtain curves of a special type, useful in solving specific problems of printing, like the following, for example (figure 11):

[a.] Limitation of Whites

Below a specific intensity in the original, the reproduction has a constant white tone. This correction is used advantageously (in the case of type printing or rotogravure), when the original to be reproduced has, in the areas with a very intense white, maximum whites with a certain extent that it is desired to reproduce with the minimum printing tone,* without, however, having the areas with still more intense white underengraved.

[b.] Limitation of Blacks

Above a specific intensity in the original, the reproduction has a constant black tone. Just as in the preceding example, the same applies to large black areas.

[c.] Declining Curve

Above a certain density of the original, a less intense tone is obtained. This concerns the case of four-color printing, about which we talk below.

[d.] Increase of High Lights

Below a specific intensity in the original, the reproduction has an absolute white. This concerns offset printing, in order to obtain clean blockouts, even if the relative white in the original is not perfectly uniform, provided it is always more intense than the maximum white of the subject to be reproduced.

4. Chromatic Correction in Four-Color Printing

The remarks made on the distorted cube of the chromatic space are based on the premise that black will be printed as the overlay of three printing colors -- yellow, blue and magenta -- saturated 100 percent, as occurs in three-color printing.

---

* For example, in typographic printing, the screen dot must always remain, however, for mechanical reasons, although reduced to the minimum.

Today, however, printing is generally done in four colors by adding black to the three colors. In this case also, the principles of three-color chromatic correction are still entirely valid, since this kind of correction is performed also primarily in four-color printing. The density of the black, or rather of the gray, which results from the lowest of the three color values, is calculated from the correct value of the three primary colors.

The simplest system for black separation is to make direct use of the black values thus obtained, reproducing in that way all the tones of gray. This leads, however, to a somewhat dirty printing, removing gloss from colors. Therefore, the tendency is to obtain a "thinner" black plate, that is to say on which the gray tones are lightened possibly to the limit of a "thin" plate on which the grays are almost completely suppressed and the black is printed only where it is necessary to give the maximum black strength (figure 12).

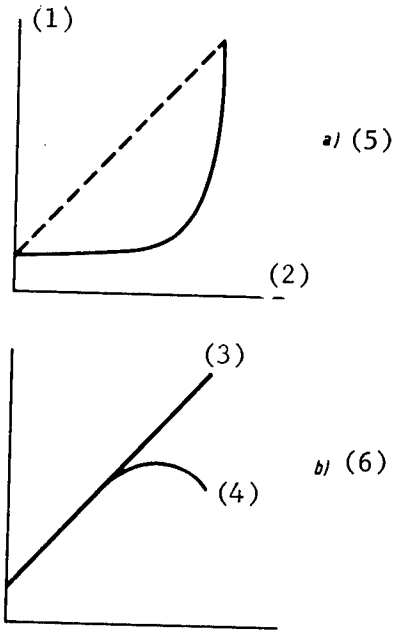


Figure 12. Gradation curves for four-color printing.
Key: 1. density of the reproduction; 2. density of the original; 3. pure color; 4. color on black; 5. "thin" black curve; 6. removal of the under-color

The use of the so-called "under-color removal," that is to say removal of colors on black for the purpose of preventing a useless, detrimental printing of full colors where full black has already been printed, is also considerably widespread, together with the use of the more or less thin black plate. Two color response curves for poor tones of black (pure colors) and for rich tones of black are reproduced in the figure.

5. Operation of the Scanner

After explaining the theoretical concepts of separation and chromatic correction, let us see how they are used in the scanner.

For simplicity of treatment, let us examine a scanner that performs reproduction in a 1:1 ratio, that is to say in the same format as the original, making one color separation at a time. This kind of device is the one that was widely used up to a couple of years ago.

The original (colorphoto) is placed on a transparent roller. The film is which the correct separation is to be exposed is placed on another roller of the same size in integral rotation with the roller carrying the original.

During rotation of the rollers, the scanning and scribing heads advance along a spiral.

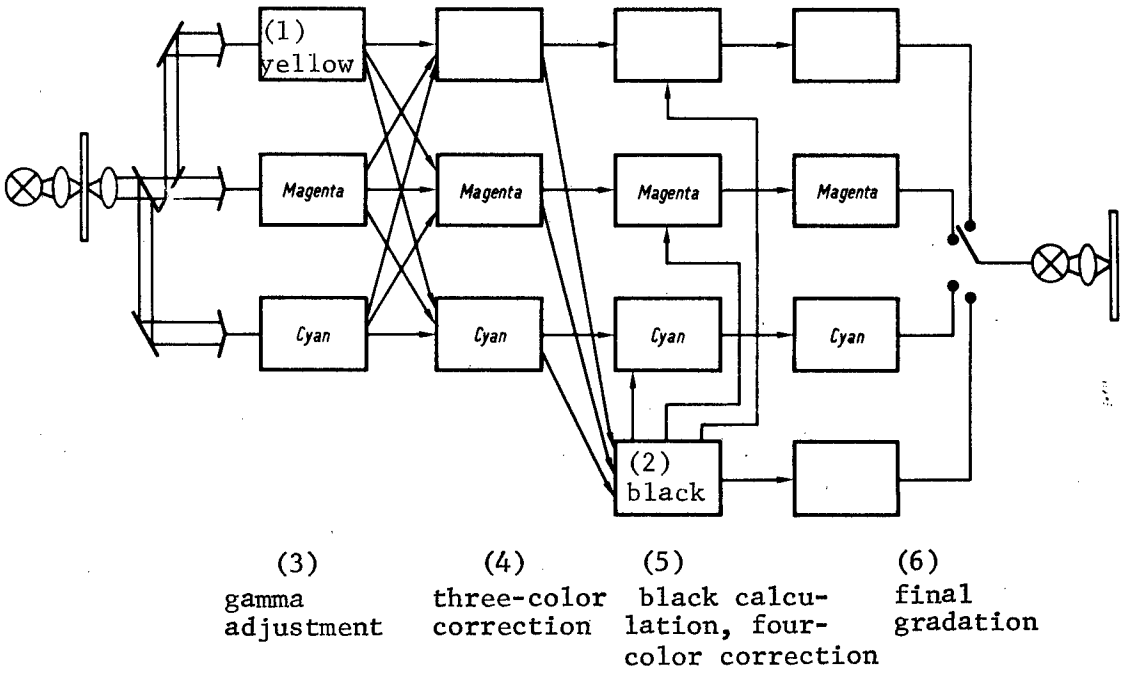


Figure 13. Block diagram of the scanner.

The light ray, produced by a small lamp (figure 13), passes through a point on the colorphoto. Then it is split into three rays that pass through the three optical filters, from which the uncorrected values of yellow, magenta and blue are obtained. Three photoelectric cells convert the light signals into electric signals that reach three "gamma regulators," which determine the correct light-dark ratio of the separation obtained for each color.

Next come the three stages of correction in three colors, in which alinement of the "whites" and of the "blacks" is performed as we described at the beginning. In these stages, in addition to making adjustments for the purpose of obtaining printing as faithful as possible to the original, it is possible to perform individual calibrations both for eliminating possible invasions of color existing in the original and for obtaining special results.

After obtaining the correct values for the three colors -- yellow, magenta and blue -- the black value of the three colors is obtained in the "black calculation" stage, and subsequently each color (including black) is corrected in terms of the the other three in the "four-color correction" stage. Removal of the under-color and formation of the thin black plate are also possibly performed.

In a final stage, the "final gradation," that is to say the response curve taking into account the individual sensitivity characteristics of the film and of the developer used and also of all the subsequent steps in the printing process, is adjusted by each color. Finally, the output signal for the color that it is desired to separate is sent to the projection lamp, which exposes the virgin film, obtaining (at will) the correct selection positive or negative in continuous color.

6. Contrast Increase in Details

Because the scanned area is not in the form of a point at a given instant, but, rather, has a finite dimension, the electric reading signal presents a rather definite gradual variation in the abrupt tone transitions. This would lead to a loss of detail in reproduction.

In order to avoid this disadvantage, a device is used that makes it possible to increase the contrast in details.

For the purpose of understanding the operation of this device, let us assume that there is, in an original, a definite transition point from a white to a black (figure 14, a).

At the same time as the scanning of the area in question instant by instant takes place (b), a second scanning on a larger area is performed, obtaining a flatter signal (c).

A difference is performed in the electronic unit between the two signals, obtaining a double pulse (d), which, when superimposed on the main signal, finally gives a signal (e), which presents, in the transition from white to black, a more white value alongside a more black value. This device -- whose effect can be adjusted at will -- makes it possible to enhance all the details of the image, giving them a vividness definitely superior to the original itself.

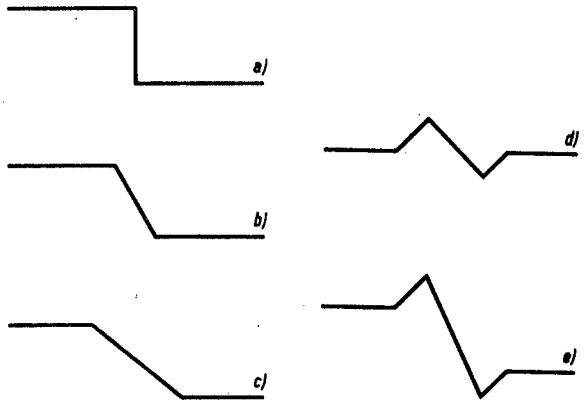


Figure 14. The principle of an increase of contrast in details.

7. Digital Enlargement

For several years, all scanners made could produce separation only in a 1:1 ratio with regard to the original. This made it necessary to make a duplicate of the original colorphoto, in order to bring it to the proper size or to enlarge the correct separations obtained by the scanner. These processes presented problems, certainly solvable but making the processing cycle more complicated.

The introduction of an electronic variation of the ratio, obtained with two different systems longitudinally on the roller and along the circumference, made it possible to overcome this disadvantage.

The following is the operation along the circumference (figure 15): the image scanned on the original, separated and corrected by the analog method as we have already described (and, therefore, pertaining to a given color), is divided in a number of components, for each of which the light density value is memorized in an intermediate memory. Two memories, each with the capacity of one line on the circumference of the roller, are stored alternately (one for odd lines and the other for even lines).

During the next rotation (even, for example), the memory for the preceding line (odd) is read with a different velocity and, therefore, the scribing roller is exposed correspondingly. If, for example, the scribing velocity is double the reading velocity, the line will be inscribed on a half space and, therefore, the size of the reproduced image will be half the original. If, instead, the scribing velocity is half the reading velocity, the line will be inscribed on a double space and, therefore, the size of the reproduced image will be double the original (figure 16).

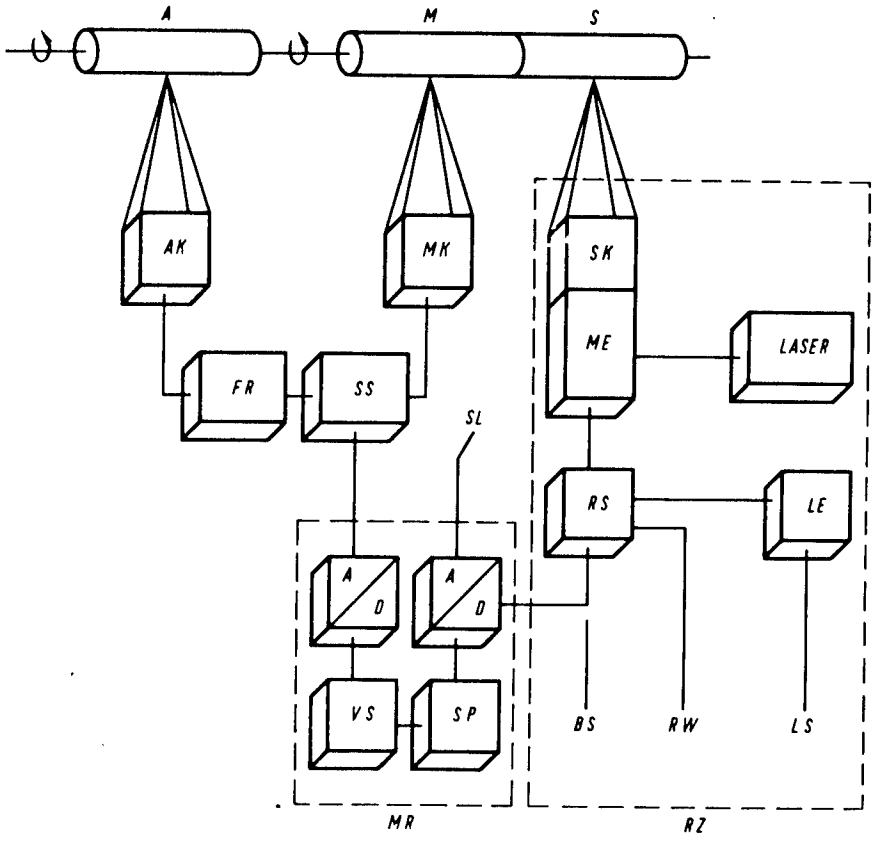


Figure 15. Digital enlargement and electronic screening with laser beam. Block diagram of the DC-300 scanner.

The ratio variation is modified digitally and, therefore, in discrete steps, but with such a fineness as to be able to be regarded as almost continuous. In order to make better use of the available areas even with the vast range of ratio variation (for example, from 20 percent to 420 percent), interchangeable rollers with various diameters are used. Each one is suitable for a band of the reproduction ratio.

Longitudinally, ratio variation is accomplished much more simply by varying (still digitally) the control frequency of the small motor for advancing the carriage carrying the recording optics.

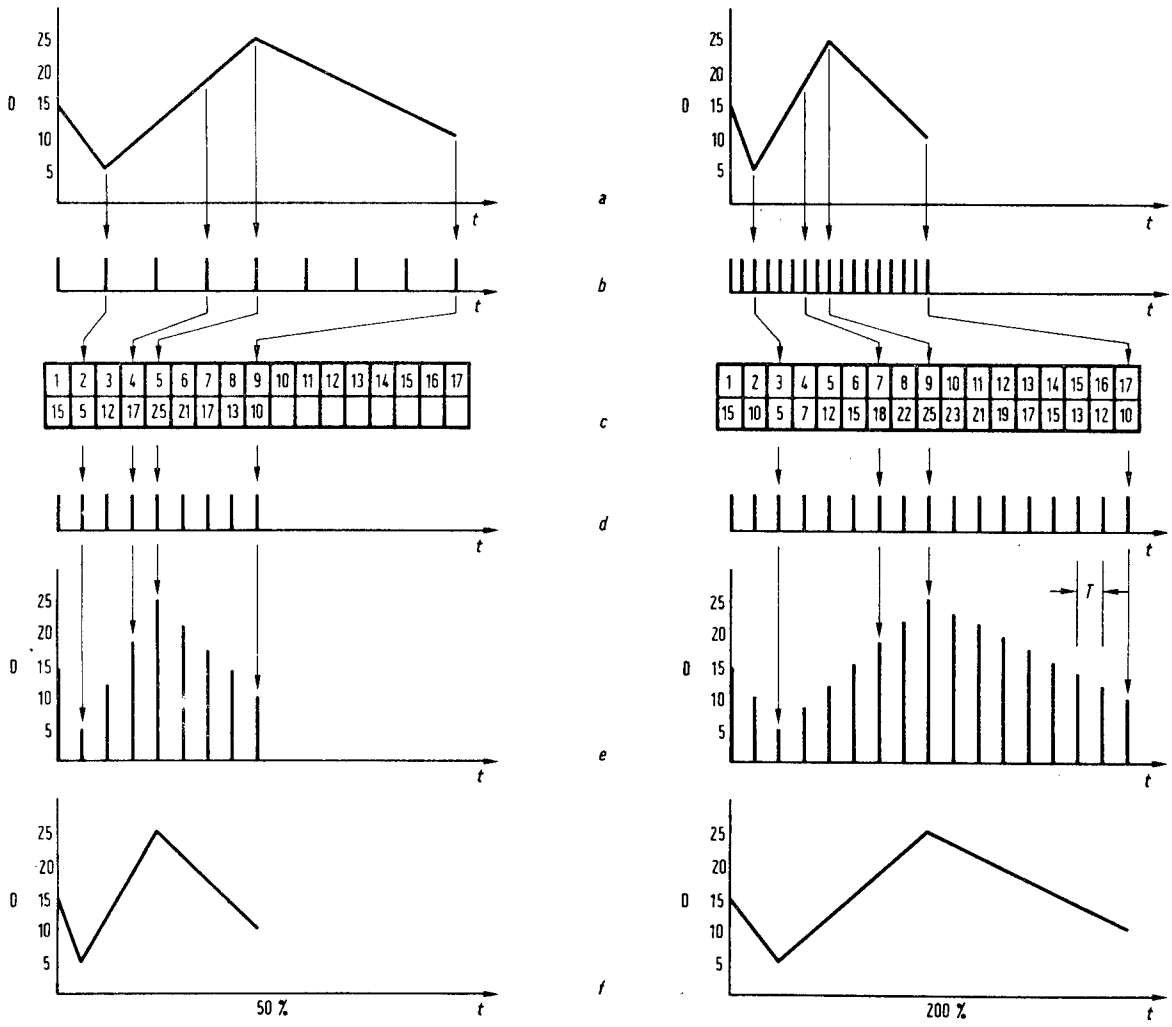


Figure 16. Principle of digital enlargement.

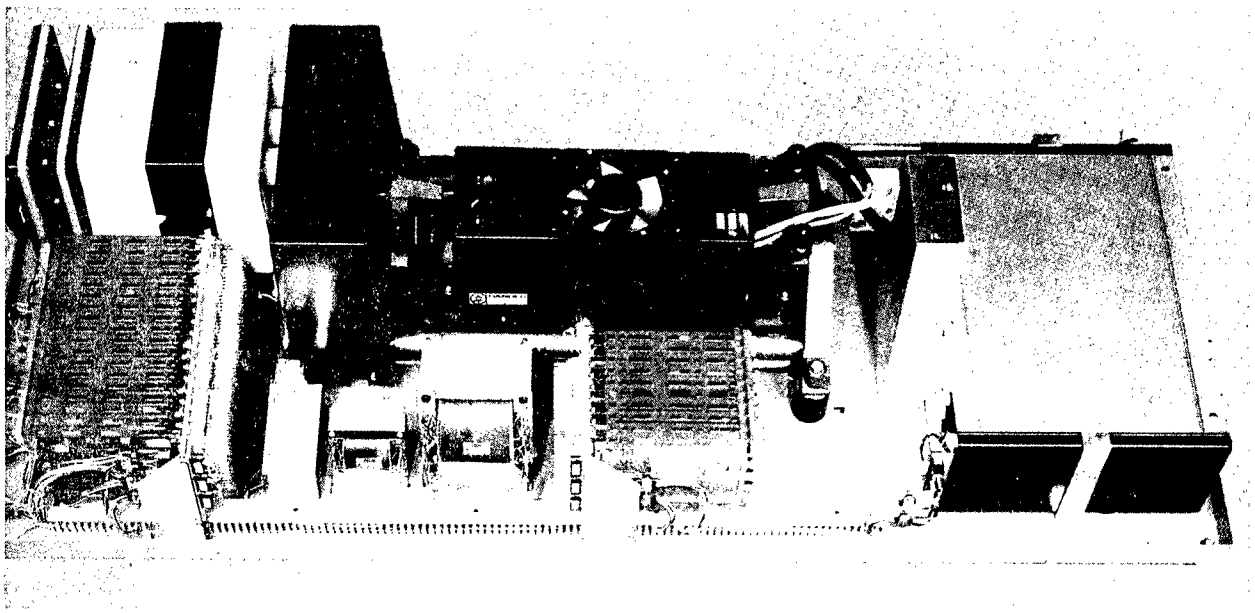
8. Electronic Screening by Means of Laser Beam

In the first scanners, separations could be obtained only with continuous color. Screening had to be performed subsequently with the conventional photomechanical system.

A first step forward was taken by the possibility of performing screening by contact during separation in the scanner. That can be achieved easily by placing screens on the frames together with virgin films in accordance with the angles required for each color. In this way, in place of continuous color separations, separations already screened are obtained, particularly advantageous in the case of offset printing.

The difficulties inherent in contact screening are due to the fact that the light projected through the screened films by the projection lamp is insufficient for exposing the film at the normal working speed of the scanner. Therefore, it is necessary to reduce the speed of rotation of the rollers.

Much progress has been made recently with a new device making it possible to perform electronic screening with a laser beam, in production now and already extensively used in the Hell DC-300 scanner (figure 17). The following is the operation (see block diagram, figure 15, again).



The digital signal available in memory after separation, chromatic correction (by analog) and conversion of the reproduction ratio (digital), rather than reconverted into analog for control of the scribing lamp, is used again in digital form in the electronic screening unit with laser beam.

Depending on the signal level and the angle desired for the screen, six parallel signals (figures 18 and 19), suitably processed by means of a recorded program, are obtained at the output of the computer unit. These six signals modulate an equal number of laser beams, obtained by splitting from one single source. They are projected on the film to be exposed and they "construct" half a screen component. In the next step, the other half screen component is constructed by analog. Consequently, longitudinal advance corresponding to a screen pass is obtained every two revolutions of the drum and the screen design is constructed by means of twelve lines side by side.

A 45° angle is used in traditional photomechanical methods for the black screen, 0° for the yellow and ±15° for the red and the blue. These angles lead to a ratio between screens and advance pass that are in the ratios of

$$\sqrt{2}, 1, \sqrt{\frac{2+\sqrt{3}}{4}}$$

that are not rational among themselves. In the case of electronic screening, construction of the screen design by means of a recorded program makes repetitiveness of the program after a limited number of steps indispensable.

The following considerations were taken into account, in order to achieve this result:

[a.] The 0° angle setting, obviously, presents no problem, since there is repetitiveness at each screen step (figure 20).

[b.] A slightly different screen is used for the 45° angle setting, in order to have eight screen components in the area on which there are nine for the 0° angle setting (figure 21).

[c.] Angle settings of ±18.4° with a screen that has 10 components in the area on which there are 9 for the 0° angle setting are used in place of the ±15° angle settings. As can be seen, this combination makes repetitiveness possible at every four passes in screening (figure 22).

In conclusion, slightly different screens, in ratios of $\sqrt{8}$, $\sqrt{9}$, $\sqrt{10}$ among themselves, are used for the various angle settings. Experience has shown that there is no formation of moiré.

The fact that the screen design is constructed by means of a recorded program makes it possible to use the most suitable form of screen (round, square, and so on). For example, a double dot screen can be used (figure 23).

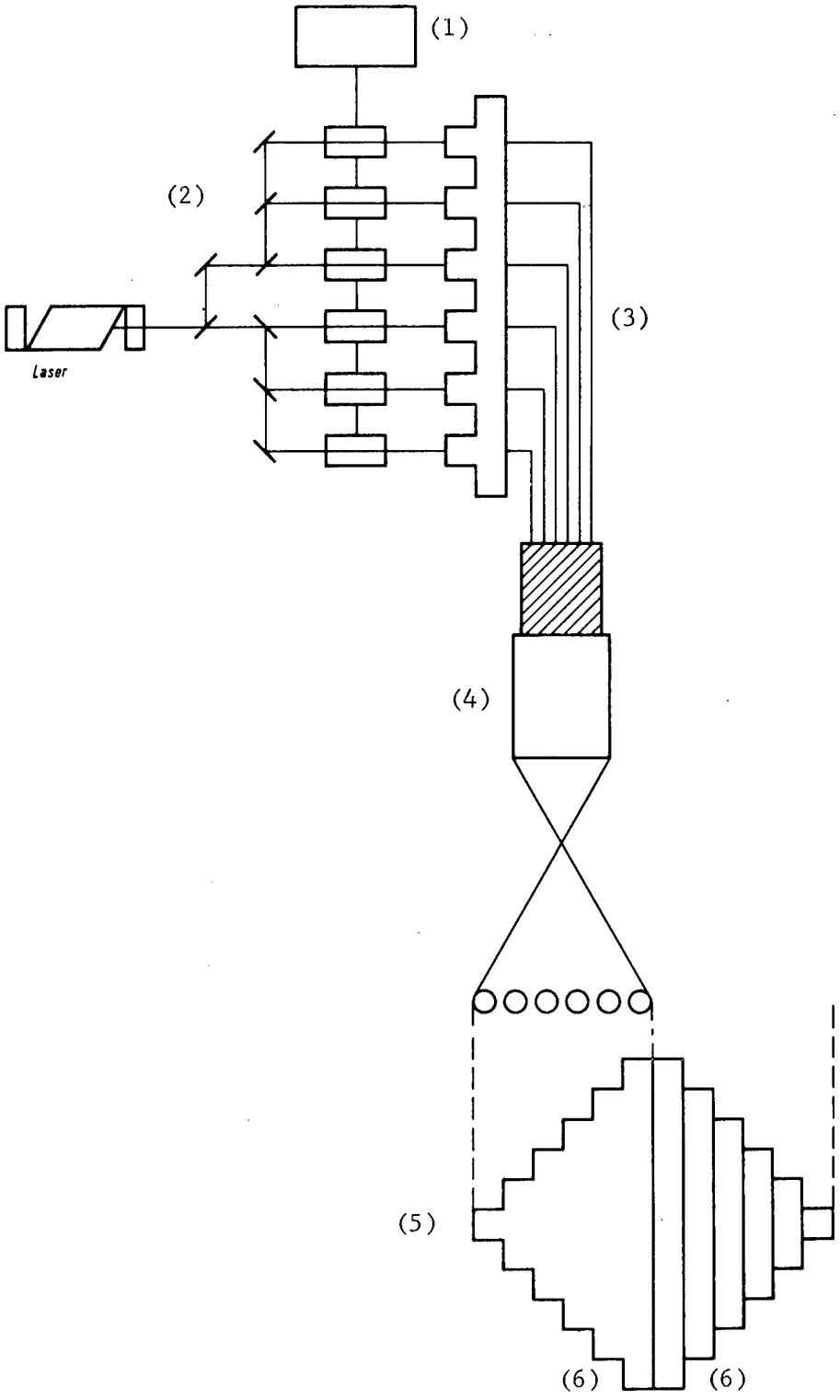


Figure 18. Electronic construction of the screen. Block diagram.
Key: 1. screen computer; 2. mirrors and modulators; 3. optical fibers; 4. zoom objective; 5. screen dot; 6. revolution

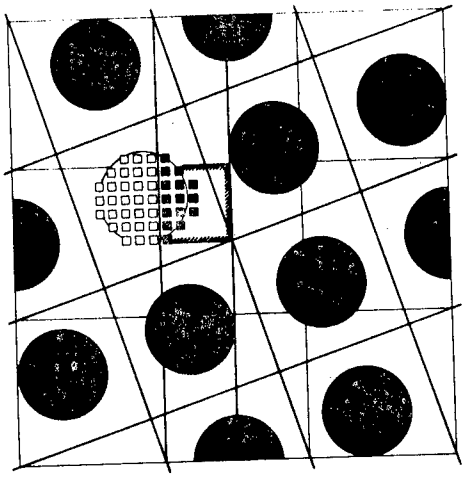


Figure 19. Electronic construction of the screen.

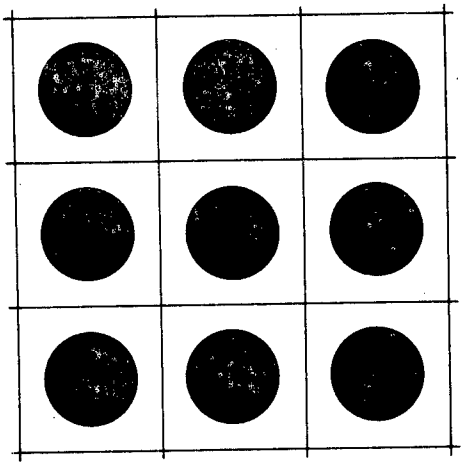


Figure 20. The screen at 0°.

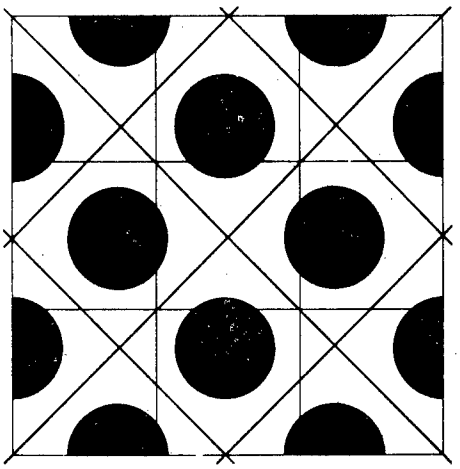


Figure 21. The screen at 45°.

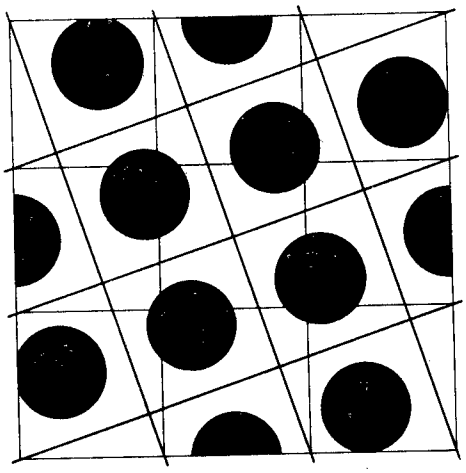


Figure 22. The screen at 18.4°.

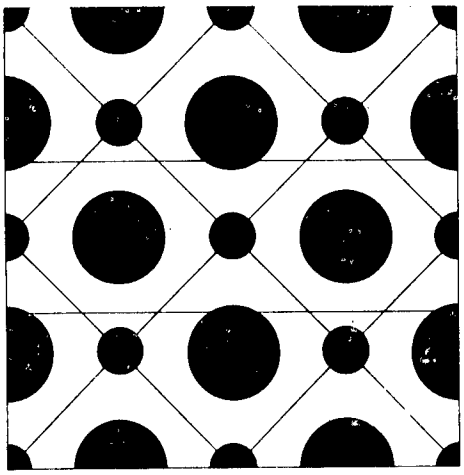


Figure 23. Double dot screen.

Equipment Used in Rotogravure Roller Etching Described

Milan TELECOMUNICAZIONI in Italian No 62 Mar 77 pp 23-32

[Article by Gian Paolo Pansieri: "Electronic Etching of Rotogravure Rollers"]

[Text] Continuing with a description of the applications of electronics in the field of printing, a sophisticated item of equipment for etching rotogravure rollers without using chemical processes is described.

1. Introduction

In a previous article,* equipment for electronic color separation was described. In order to complete the picture, a description is given of another type of equipment developed by the Hell Company, of the Siemens Group, for the graphic arts sector, that is to say electronic etching by Helio-Klischograph rotogravure rollers.

2. Printing Systems

There are a number of systems that can be used for printing, but there are three most commonly used (figure 1):

[a.] Typographic Printing. The printing matrix carries the type in relief. The inking roller inks the parts in relief. When the matrix and the paper are brought in contact, the ink passes from the parts in relief on the matrix to the paper.

* See TELECOMUNICAZIONI, No 59, pp 31-42.

[b.] Lithographic Printing. The printing matrix carries the type on a plane on a sensitized plate. The inking roller leaves the ink only on the sensitized parts, while the remaining parts reject the ink and remain clean. When the matrix is placed in contact with the paper, the paper receives the ink only from the sensitized parts that held it.

[c.] Copperplate Printing. The printing matrix carries the type sunk in the plate. The inking roller inks the whole matrix. A doctor blade removes the excess ink, leaving only the ink that has entered the depressions. When the matrix and the paper are placed in contact, the ink passes from the sunken parts of the matrix to the paper.

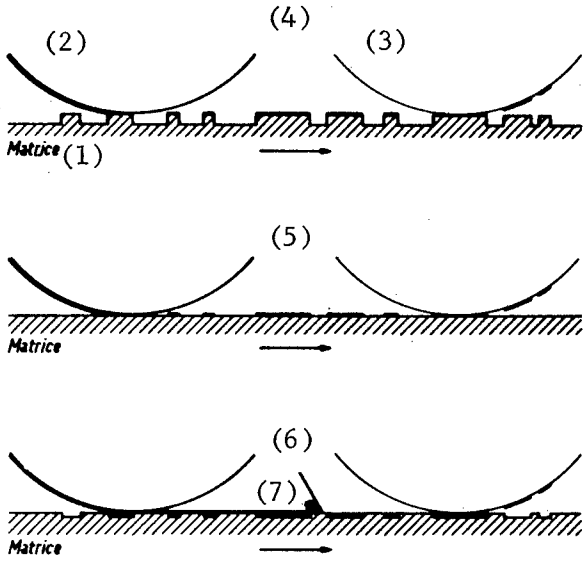


Figure 1. Printing systems.
Key: 1. matrix; 2. inking roller; 3. paper; 4. typographic printing; 5. lithographic printing; 6. copperplate printing; 7. doctor blade

This may be performed for all kinds of printing, sheet by sheet, or on a rotary press on a continuous roll of paper.

Without going into the other topics of comparison between the various systems, which go beyond the scope of the present article, let it suffice to mention briefly that, in going from typographic printing to lithography and to rotogravure, the cost of preparing the matrix increases and the cost of printing, strictly speaking, decreases. Therefore, generally speaking, typographic printing is suitable for a small printing run, lithography for a medium-sized run and rotogravure for printing a large number of copies.

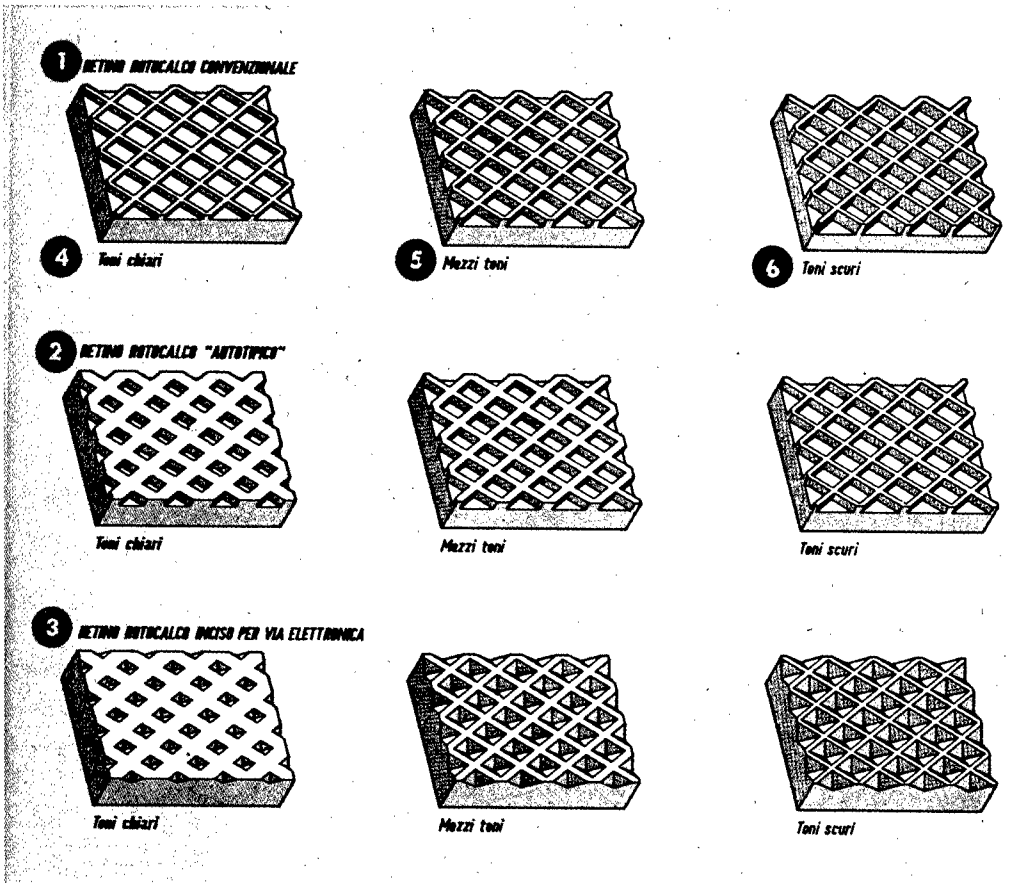


Figure 2. Rotogravure etching systems.
Key: 1. conventional rotogravure screen; 2. "autotypic" rotogravure screen; 3. rotogravure screen etched electronically; 4. light tones; 5. medium tones; 6. dark tones

3. Rotogravure Printing

In rotogravure printing, large rollers covered with a layer of copper, up to a meter in diameter and 2 to 3 meters long, are used as matrices. These rollers are etched chemically in an acid-bath department or by means of other systems (like the one illustrated) and then are fitted on the rotary press by means of which the paper, on rolls, is printed.

Four rollers have to be etched and inserted on the rotary press for color printing in four colors, one for each of the separated colors, red, yellow, blue, black.

Since both sides of the paper are printed, the number of printing rollers has to be double (two for black-and-white printing, eight for color printing).

Screening is used, in order to obtain the various tones of gray in illustrations, in rotogravure printing as well as in the other kinds of printing. A different type of screening is used depending on the method of preparing the rollers (figure 2).

According to the conventional method, etching of these rollers is performed by means of a complex photographic and chemical process. The various tones of gray are obtained by means of a screen (usually with 60 or 70 lines per centimeter) having parallelepipedal cells equal in area and differing in depth.

A second type of screen (called autotypic) also has parallelepipedal cells equal in depth and differing in area.

Finally, with electronic etching, a screen is obtained with pyramidal cells with variable area and depth.

The photographic and chemical process of the conventional method is critical and complicated and requires especially expert personnel, with very strict attention to heat and humidity environmental conditions. A small error is sufficient to made a roller, whose cost is not insignificant, unusable.

Hell Company has, therefore, developed an electronic etcher, the Helio-Klischograph, which ensures roller etching free from the risks inherent in the conventional system and, therefore, it ensures a high, consistent and exactly repetitive quality.

4. Electronic Etching

It must be stated first of all that the term "electronic etching," used currently for brevity, is not quite accurate, since etching takes place by means of a mechanical tool.

In view, however, of the fact that the basic component of this equipment consists of the electronic unit, the abbreviated term of "electronic etching," now in use, can, however, be accepted.

The following is the principle of operation, in outline form:

[a.] Photoelectric scanning of the original.

[b.] Electronic processing.

[c.] Mechanical etching.

A more detailed description is given in paragraph 5.

A first advantage is provided by the fact that the ink is removed more easily from cells with a pyramidal shape than from cells with a parallelepipedal shape. A saving in the amount of ink required is achieved (however it has to be more concentrated).

A second and still more important advantage lies in the longer life of the rollers. In fact, with the conventional system we have screen components, in the white areas, with very thin support sides and with a rather shallow etching depth. Consequently, these sides are worn down by the wear and tear caused by the doctor blade and the paper and an intolerable variation of tone occurs in a relatively short time in the maximum whites.

On the other hand, with the electronic system we have large support areas and deeper cells in the whites. Consequently, wear and tear is less and also the effect of depth variation is minor.

Electronic etching requires, moreover, the use of copper with a greater hardness in comparison with conventional etching.

For these reasons, with the use of electronically etched rollers, it is possible to obtain larger printing runs without chromium plating the surface of the rollers, an operation that can be performed, at any rate, if desired.

These advantages, together with the geometric shapes of the dot, are undoubtedly considerable, but the definite advantage of these machines in comparison with the conventional system is provided by the reliability of the results, since the machine replaces the entire last part of the process of preparing rotogravure rollers, which is still performed today, in the age of automation, by means of a handicraft, empirical system, subject to a number of factors of uncertainty (handling pigment paper, affected rather critically by temperature and humidity conditions and the final acid-bath process still entrusted solely to the experience and intuition of the operator).

Still today, very frequently (and regarded almost as normal) it is necessary to remake some rollers because of some errors in the process. With the electronic system, on the other hand, it is guaranteed that two etchings prepared with the same calibration values will always give exactly identical results.

5. The K-200 Helio-Klischograph.

The K-200 Helio-Klischograph represents the most recent model of a family of equipment developed in recent years.

It consists (figure 3) of a sturdy base, about 4 meters long, on which the scanning roller and the etching roller are arranged.

Both rollers can be equipped with more scanning or etching heads, in order to shorten the operating times of the Helio-Klischograph. The area etched in an

hour is actually 0.3 square meter for each head. By using six etching heads, for example, an area of about 1 square meter can be etched in half an hour.

The electronic devices are contained in a separate cabinet.

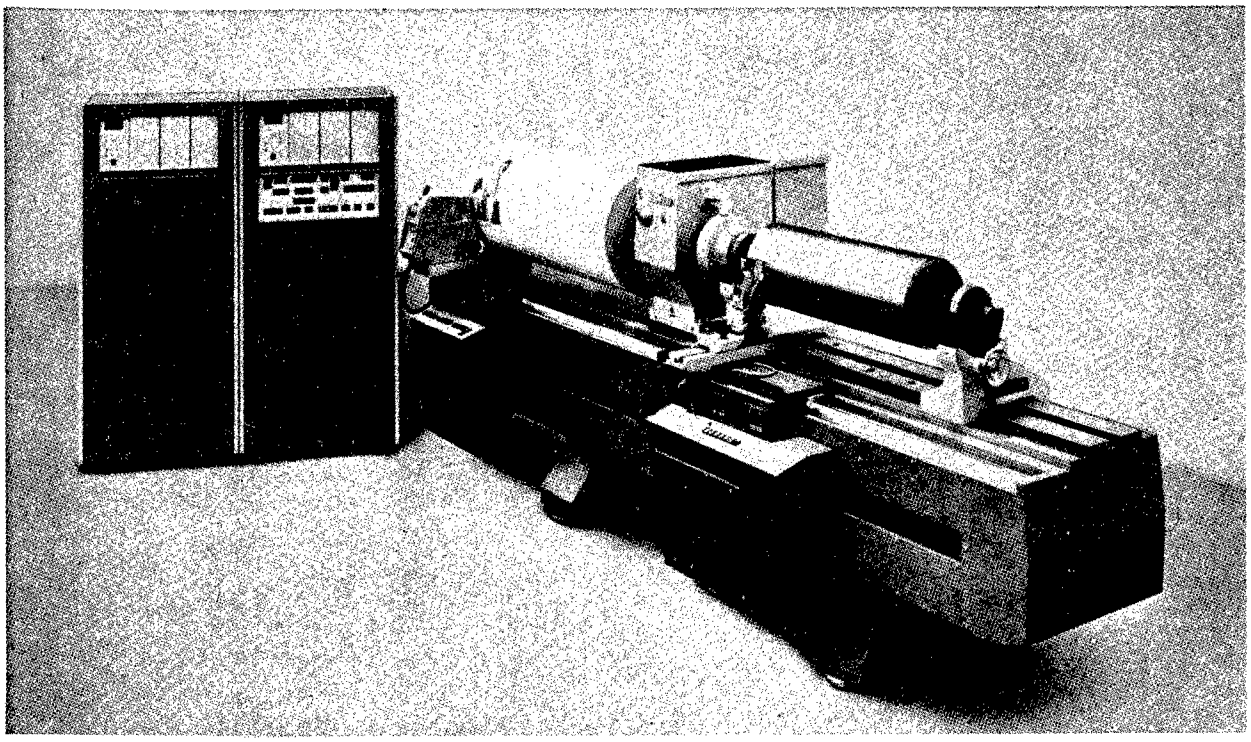


Figure 3. View of the K-200 Helio-Klischograph, with the cabinet containing the electronic part on the left.

A. The Original

The original is analyzed by reflection and may be positive or negative, face or back up. It is formed by photographic reproduction of entire magazine pages to be reproduced complete with text and photographs. These pages must have extreme black and white values and contrast between them, since there is one single adjustment. The originals must not be screened, but rather are in continuous color, because the Helio-Klischograph itself takes care of screening.

The material to be scanned has to be opaque, because scanning is performed by reflection. Therefore, all the products coming from the photographic departments and composition are copied together on opaque material by means of a standard bromograph.

The fact that the extent of the photographic gamma of printing on paper is inferior to the gamma of a film presents no problem, because the Helio-Klischograph can obtain the extent of the gamma up to the suitable value electronically.

In the case of color printing, all the operations of separation and chromatic correction must be performed for nothing. The original inserted in the Helio-Klischograph is a black-and-white print of the correct separation of each color. The Helio-Klischograph, in fact, is not sensitive to colors and it etches tones on the roller with maximum fidelity.

b. Group for Scanning the Original

Since electronic processing may take place at any time for one single component of the image, the image has to be examined subsequently dot by dot. In other words, the image is subdivided in lines that are scanned, one after the other, by a light beam. The light values reflected or passed through the original, more or less light depending on the component of the image scanned, strike a multiplier that converts them into electric signals (figure 4).

The light source and the multiplier are contained in a scanning head, with an optical assembly and the pertinent electronic part.

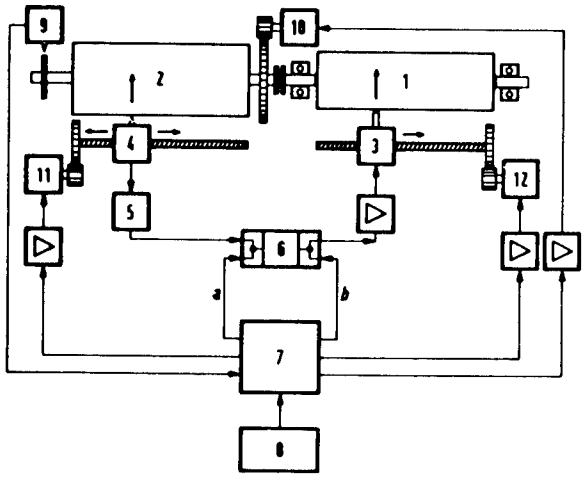


Figure 4. Block diagram of the K-200 Helio-Klischograph.
Key: 1. etching roller; 2. roller carrying original; 3. etching system; 4. optical scanning head; 5. signal preconditioning; 6. image line memory; 7. control; 8. control panel; 9. zero pulse generator; 10. main motor; 11. optical motor; 12. etching system motor; ▷ amplifier; a. scanning pulses; b. etching pulses

c. Electronic Assembly

The electronic assembly processes the signals coming from the scanning unit, making them suitable for controlling the etching assembly.

During processing, in addition to amplification of the signal, corrections required by printing take place. They can be summarized as gamma adjustment with maximum and minimum correction, gradations capable of being introduced at will, increase of detail contrast, and so on.

In the case of the Helio-Klischograph, the originals inserted (photoreproductions of complete pages) are standarized, and thus also the subsequent printing process. Therefore, calibration of the electronic assembly is performed very carefully and with repeated tests only when the machine is installed and it is kept unchanged until some component of the printing process (for example, the kind of ink) is varied.

Digitizing and intermediate memory storage are also performed in the electronic assembly by varying the reproduction ratio, described in section 6, below.

In addition to within the computer, there also are electronic groups that perform a number of special tasks (multiplication, or some other), described below.

d. Etching

Etching of the copper roller is performed by means of the etching head (figure 5) simultaneously with the scanning of the original.

In order to obtain the screened image, the etching stylus is subject to two different controls added to each other. The first control is provided by the signal coming from the scanning part and raises or lowers the stylus depending on whether a whiter or a blacker dot on the original is being scanned. With this control, which operates almost continuously, a more or less deep groove would be made in the surface of the roller. A second control is superimposed on this signal. It is a sawtooth signal with constant amplitude. The sum of the two controls, together with the motion of rotation of the roller, makes the stylus generate, on the surface of the roller, pyramid-shaped small cells, more or less wide and deep depending on whether the dot scanned on the original is more black or more white (figure 6).

6. Digital Variation of the Reproduction Ratio

In earlier models of the Helio-Klischograph, the two rollers -- scanning and etching -- were integral with each other and reproduction had to take place in a 1:1 ratio. Therefore, the original to be scanned had to be in the final printing format and the roller carrying the original to be scanned had to have the same diameter as the etching roller.

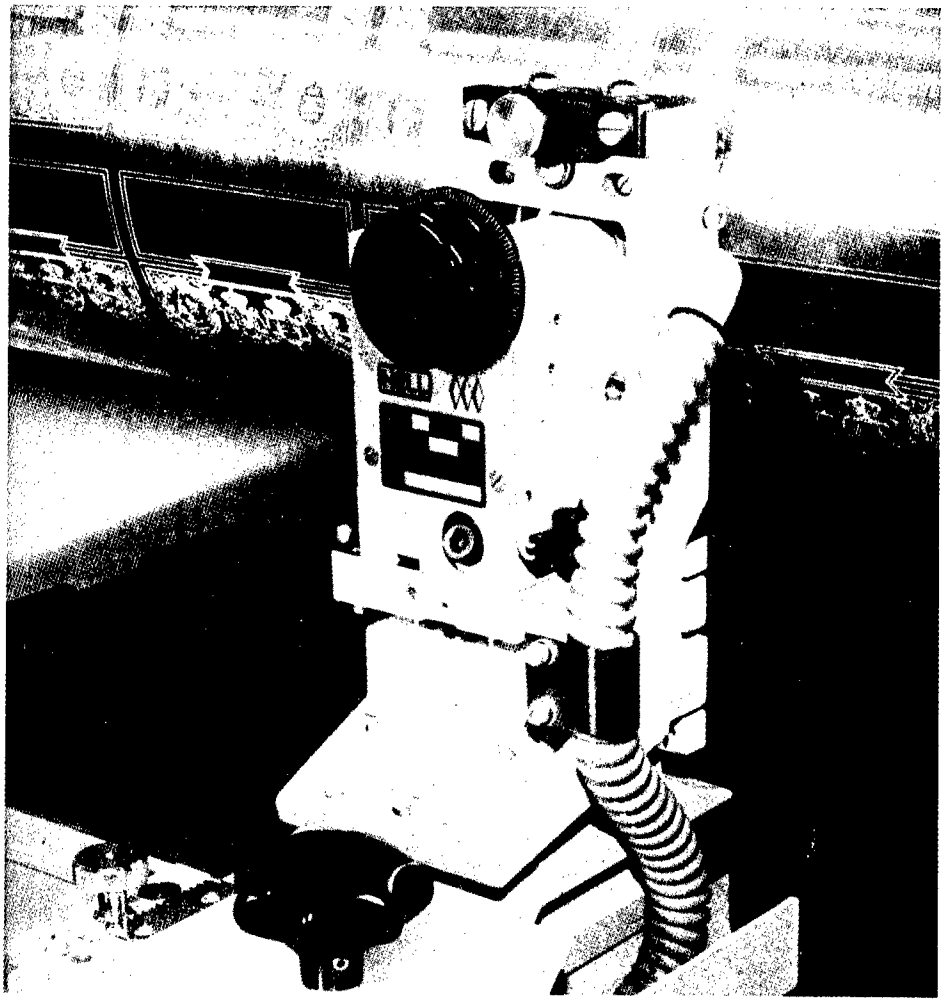


Figure 5. K-200 Helio-Klischograph. Detail of etching head.

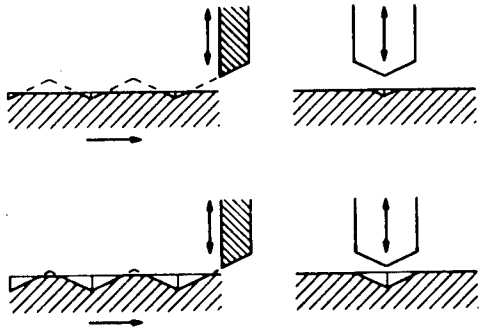


Figure 6. Action of the etching stylus.

As long as the etching rollers are used for printing magazines, weeklies, catalogs, and so on, this is no great limitation, because every printing industry, even the large-sized ones, uses a limited assortment of kinds of rollers and works in accordance with a weekly schedule that is repeated for years. Therefore, expenditure for rollers carrying the original can be amortized over a long period of time.

The new K-200 model, however, is designed for other kinds of printers, in addition to the printing industry, for example for wallpaper or for rolls of paper for printing fabrics by means of the transfer system (transfer of color from the paper to the fabric by means of heat sublimation). For these purposes, the printing roller sizes can be very variable. Therefore, it was necessary to move in the direction of a different solution.

The positive experience already acquired with the DC-300 color scanners with digital memory made it possible to carry over to the K-200 the system for digital variation of the reproduction ratio.

This system has already been described in the article mentioned at the beginning. The principle is reviewed here briefly (see figure 4 again):

[a.] Analog scanning of the original.

[b.] Analog processing of the values read, in order to make the necessary corrections for a correct etching.

[c.] Analog-digital conversion of the scanned, corrected values.

[d.] Storage of the digitized values in memory.

[e.] Recall of the digital values stored in memory, with a different velocity corresponding to the etching velocity.

[f.] Digital-analog conversion of the above values.

[g.] Addition of the sawtooth signal for the screen and etching of the copper roller in accordance with the scanned, corrected values.

The need for etching the roller over its entire circumference, without seams, indispensable for printing wallpaper or paper used for fabric print transfer, has made it necessary to adopt a special process for storage in memory and for feeding the rollers, illustrated on the basis of figure 7.

The scanning roller has a size slightly larger than the diameter of the etching rollers used.

Differently from the DC-300, on which scanning and exposing the film take place along a spiral (with continuous feed of the reading and scribing heads with regard to the rollers), in the K-200 Helio-Klischograph scanning and etching are performed for each line along the circumference and advance of the reading and etching heads is performed step by step.

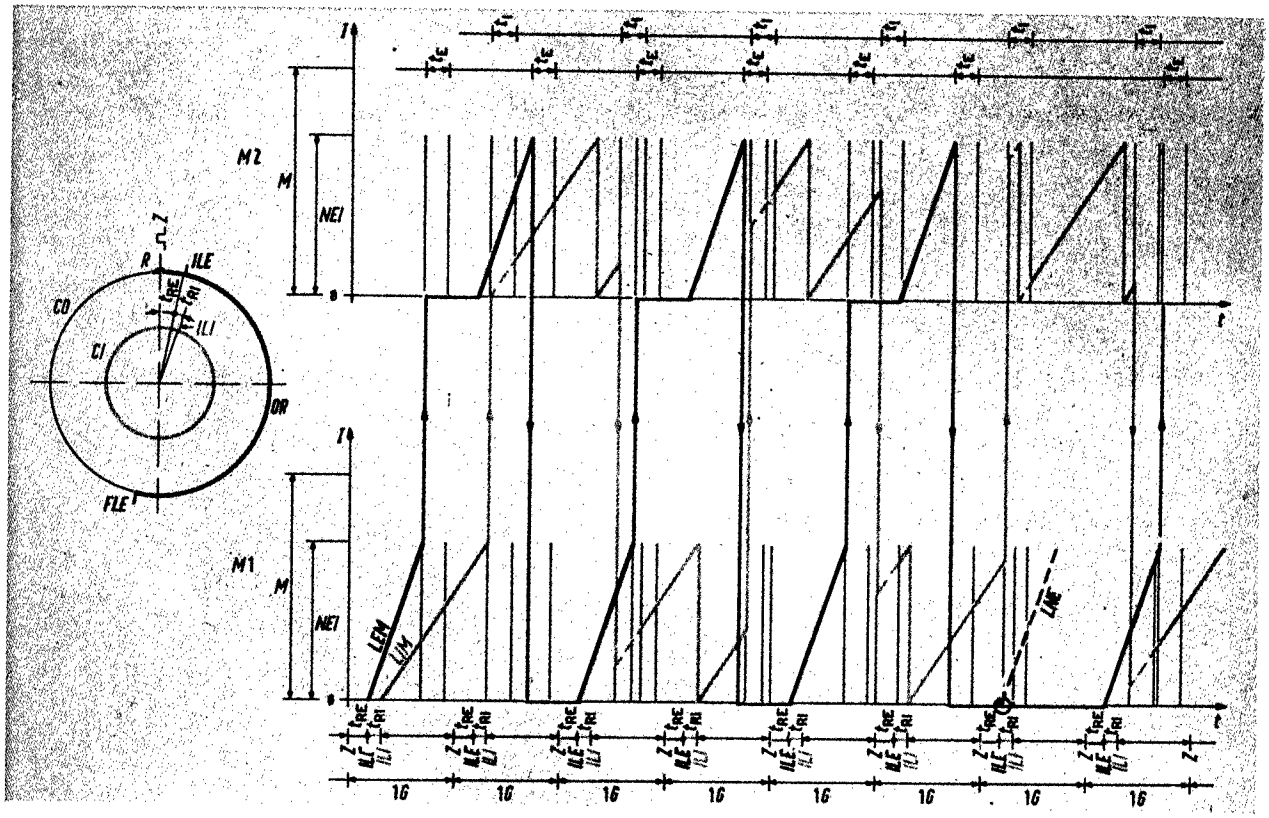


Figure 7. Time diagram of the scanning and etching operations.

Key:

CO = roller carrying original
OR = original
R = row of recording posts
Z = zero pulse
t_{RE} = scanning start delay angle
ILE = start of scanned line
FLE = end of scanned line
CI = roller to be etched
t_{RI} = etching start delay angle
ILI = start of etching line
M1 = field of memory 1
M2 = field of memory 2
I = address
t = time
M = memory capacity
NEI = number of image components on a circumference line of the roller to be etched
Ø = zero address
1G = one revolution of the roller
t_E = no-load advance time of scanning head
t_I = no-load advance time of etching head
LEM = scanning line, stored in memory
LIM = etching line, read from memory
LNE = unscanned line on original

The original attached to the reading roller does not cover its entire surface, but leaves an unused section.

During the first revolution of the roller, the information read, corrected and digitized is stored in memory M1. In the last part of the revolution, where

there no longer is any scanning, the reading head advances one step. The reading operation is repeated in the next revolution, but storage is performed in memory M2. This action is repeated, with storage alternating in the odd revolutions in memory M1 and in the even revolutions in M2 (red lines in figure 7).

Etching of the first line begins shortly after the start of storage in memory, beginning with the memory 1 cell and performing etching along the entire periphery of the roller. On completing of etching of the first circumference, the etching head also must advance one step, but during this phase of advance there must be no etching. Therefore, etching has to be eliminated for a certain amount of time, while the roller continues to rotate, however. When the operation of advance of the etching head has ended and etching can be resumed, it is at a more advanced point on the printing roller with regard to the first revolution. In order to obtain correct reproduction of the image, recall from memory M2 must, therefore, not begin from the memory 1 cell, but rather from a subsequent cell corresponding to the most advanced point reached on the circumference, for example cell 251. On completion of recall of memory up to the last cell stored, reading of cells from 1 to 250 must continue, in order to complete etching of the second line on the circumference of the printing roller (blue lines in figure 7). At this point, etching must again be interrupted for a certain period of time, in order to allow further advance of the etching head. Etching of the third line begins from cell 501 of memory M1 to the end and, therefore, from 1 to 500. Similarly, the fourth line will be etched starting from cell 751 of memory M2 and so on.

In this way, at each line, etching accumulates a delay with regard to scanning. At a certain point (seventh passage, small black circle in figure 7), etching is more than one revolution behind scanning and this would cancel data not yet used for etching in memory. In order to prevent this disadvantage, scanning, recording in memory and advance of the scanning head must be eliminated for one revolution (the seventh in figure 7). This permits the etching system to make up lost ground. At the next revolution (eighth in figure 7), scanning and storing of the seventh line in memory M1 are performed and the process can resume and continue.

7. Various Ways of Operating

The operating principle of the K-200 Helio-Klischograph is especially designed to handle various problems that come up in printing wrapping paper, wallpaper, fabrics with the transfer system, and so on.

They are (figure 8):

1.) Repetition in direction of the circumference. The data of each line stored in memory are recalled several times during the revolution, in order to etch the same image several times.

2.) Continuous etching without seam in direction of the circumference.

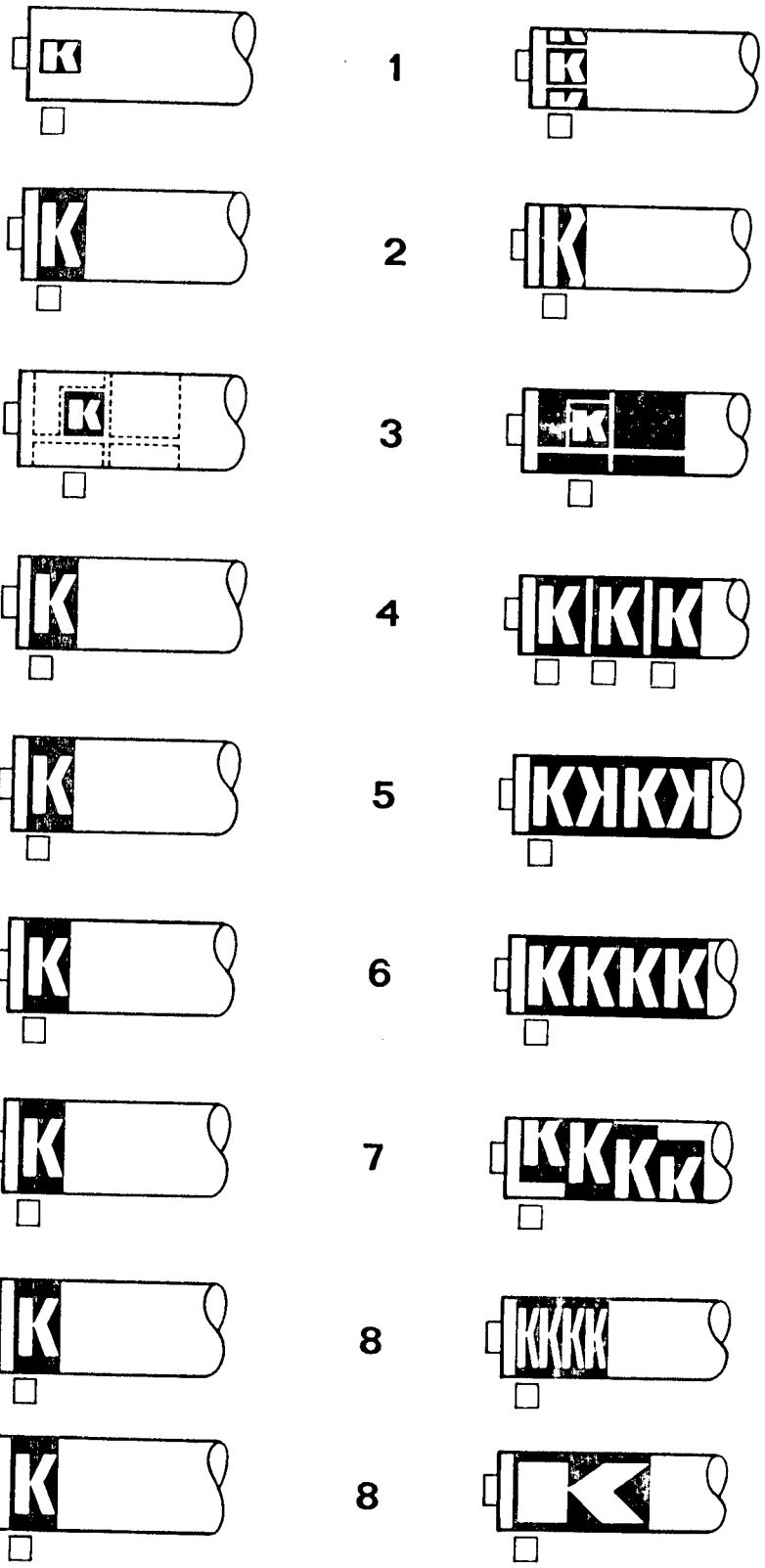


Figure 8. Diagrammatic presentation of the various ways of operation.

3.) Etching in two cycles. Rollers already partly etched can be completed in a second run with further etching in perfect register.

4.) Repetition in direction of the axis. By connecting more etching heads in parallel, it is possible to etch the same subject several times simultaneously in direction of the axis in the time required for one single etching (it is not possible to have the image seamless at the point of passing from one head to the next.

5.) Symmetrical repetition. Starting from the left of the original and advancing toward the right, a normal etching is made with direct reproduction. Then the advance of the scanning head is reversed from right to left and the subject is continued to be etched toward the right by means of mirrors. At the end, the direction of advance of the original is again reversed and etching is accomplished upright, and so on.

6.) Repetition in direction of the axis without seam. The subject is etched normally first. Then the reading head is returned to the start and it starts off again from the beginning. Etching continues without a seam.

7.) Repetition in direction of the axis with staggering, just as in 6, above, but at each repetition the image is staggered by a predetermined pitch.

8.) Change of scale in direction of the axis. By modifying the advance step on the scanning side, it is possible to obtain a compressed or elongated reproduction of the image.

8. Etching with "Laser" and With "Electronic Gun"

In order to complete the description of the electronic etching systems, brief mention should be made of systems that would make it possible -- if they are achieved -- to obtain "electronic etching" in the more literal sense of the term.

A first system, on which some persons pin great hopes, is based on the use of "Laser."

Laser consists of a thin pencil of rays equipped with very great energy sufficient for volatilizing metal particles struck by it.

Thought might be given to etching a cut by modulating a laser beam striking a metal surface, in order to form a screen.

Experiments in this connection have already been made. The difficulties encountered are due, on the one hand, to the impossibility of obtaining with continuity laser beams of sufficient intensity to bombard the metal and, on the other hand, to the fact that the craters left in the metal by the volatilized part have an irregular shape quite far from the shape of the screen needed for an accurate print.

Because of its advantage, the system is being studied seriously by the most progressive companies in the field of electronics applied to printing, but a solution of the serious problems raised seems to be still remote at present, and, therefore, this system does not go, for now, beyond the field of mere curiosity.

Another system that might solve the problem of complete electronic etching is the so-called "electronic gun," consisting of a pencil of electrons capable of vaporizing locally the material to be etched.

Here, too, the problems to be solved are difficult and complicated, especially the need for operating in a vacuum, but the features of the system make it possible to hope for an industrial production in a reasonably short time.

9. Conclusions

In rotogravure printing, a restraint on the introduction of scanners was due to the fact that, according to the opinion of some, it would not have made much sense to try to improve and make more consistent the quality of color separations, when the last phase of the process, that is to say feeding pigment paper and especially acid bath, was still in the status of empirical, primitive processes, entrusted solely and entirely to the hand and eye of the operator.

The new devices for etching rotogravure rollers have made it possible to fill this gap by finally achieving automation of the whole printing cycle.

For that reason, these machines have now attained considerable wide use in rotogravue companies for periodical printing and recently they began to find widespread acceptance for printing wallpaper and fabrics with the transfer system.

10,042
CSO: 5500

END